US DEPARTMENT OF ENERGY
BUILDING STANDARDS AND GUIDELINES PROGRAM

1993 MEC*check*™ Prescriptive Packages

1993 Model Energy Code
Version 2.0

October 1995

MEC*check*™ was developed by the Building Energy Standards Program at Pacific Northwest Laboratory (PNL) for the U.S. Department of Housing and Urban Development (HUD) and the Rural Economic and Community Development (RECD, formerly Farmer's Home Administration) under contract with the U.S. Department of Energy's Office of Codes and Standards. PNL is operated by Battelle Memorial Institute for the U.S. Department of Energy under Contract DE-AC06-76RLO 1830.

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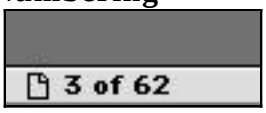

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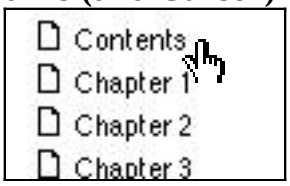

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Chapter 1

Introduction

The MEC*check*™ Prescriptive Packages were developed to demonstrate compliance with the insulation and window requirements of the Council of American Building Officials (CABO) Model Energy Code (MEC). This version of the prescriptive packages demonstrates compliance with the 1993 edition of the MEC.

The prescriptive package approach requires minimal calculations and is the simplest method for demonstrating compliance with the MEC insulation and window requirements for residential buildings (refer to the *Summary of Basic Requirements* included with Attachment B for additional requirements that must also be satisfied).

The Version 2.0 materials include prescriptive packages for both one- and two-family buildings (referred to as single-family buildings) and multifamily buildings (such as apartments, condominiums, townhouses, and rowhouses). Multifamily buildings include residential buildings three stories or less in height with three or more attached dwelling units (see Appendix A for definitions of single-family and multifamily buildings and dwelling unit). When applying the prescriptive packages to multifamily buildings, it is recommended that the packages be applied to the entire building (as opposed to individual dwelling units) if allowed by your jurisdiction.

What's Included With the Prescriptive Packages?

The *Prescriptive Package Worksheet*, your state map, and the prescriptive packages for your state are all provided with this guide (Attachments A and B). Refer to these materials while reading the following chapters.

Chapter 2, *Quick Start*, provides brief instructions on using the prescriptive packages. These instructions are designed to get you up and running in no time.

Chapter 3, *Instructions*, provides more detailed instructions for finding your climate zone, selecting a prescriptive package, and documenting compliance using the *Prescriptive Package Worksheet*.

Chapter 4, *Example*, provides a step-by-step example of using the prescriptive package approach to demonstrate compliance of a split-level house.

Appendix A contains definitions of terms used in this guide.

Appendix B contains glazing and door U-value tables that can be used in the absence of test data.

Appendix C contains metal-frame wall equivalency tables that can be used to convert the prescriptive package wood-frame wall requirements to equivalent metal-frame wall requirements.

Appendix D describes the building envelope and contains a table that is useful in determining which elements of a building are considered to be ceiling, wall, and floor/foundation components.

Attachment A, *State Maps With Climate Zones*, contains state maps divided into climate zones that fall along county boundaries. The zones are shown graphically on each map, along with an alphabetical listing of the counties and their corresponding zone numbers.

Attachment B, *Prescriptive Packages*, contains tables of prescriptive packages for each of the climate zones. To demonstrate compliance with the MEC, select a package of insulation levels from the table for your zone and document that your building complies with the requirements of the selected package. Also included in Attachment B are a summary of additional MEC requirements and three worksheets for documenting compliance.

Chapter 2

Quick Start

This chapter provides quick-and-easy instructions for using the MEC*check*™ state maps and prescriptive packages.

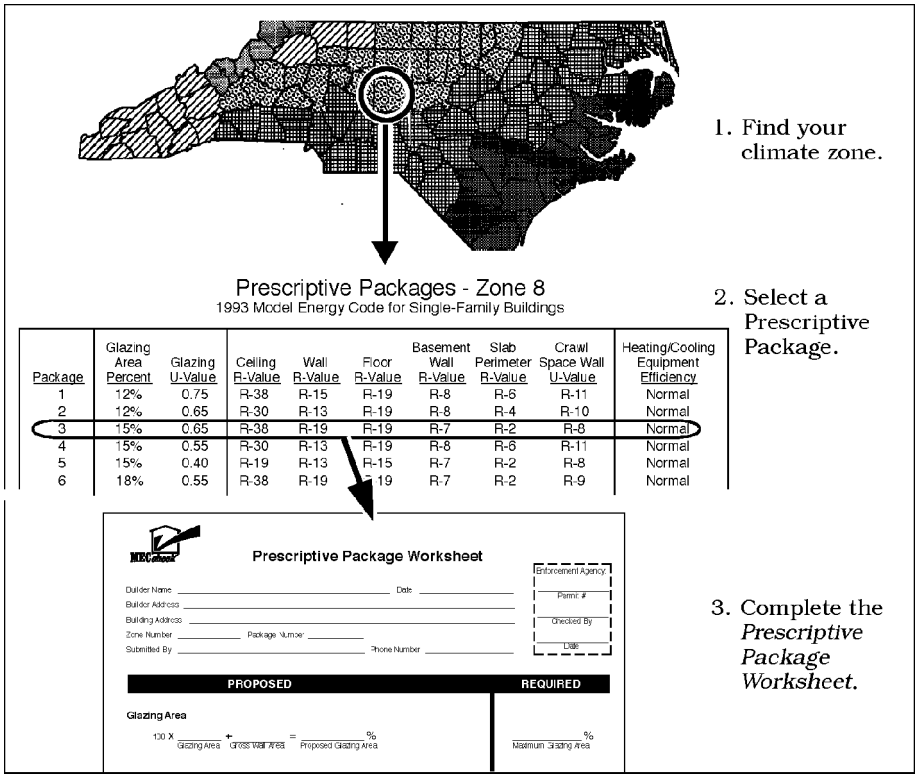


Figure 1. Using the Prescriptive Packages

1. Find Your Climate Zone

The state maps in Attachment A are divided into climate zones that fall along county boundaries. Based on the county in which your building is located, find your zone from the appropriate state map. The zones are shown graphically on each map along with an alphabetical listing of the counties and their corresponding zone numbers.

2. Select a Prescriptive Package

The tables of prescriptive packages in Attachment B correspond to the climate zones depicted on the state maps. Each climate zone has a one-page table of prescriptive packages from which you can select one package. If your building meets the insulation R-value, glazing, and (sometimes) heating and/or cooling equipment efficiency requirements specified for the package you select, then the

building complies with the MEC insulation and window requirements. Refer to the back side of the prescriptive package tables for notes that further clarify the requirements.

3. Complete the *Prescriptive Package Worksheet*

Fill in the *Prescriptive Package Worksheet Step-by-Step* to document your building's compliance with the insulation and window requirements of the MEC. Be sure to include the zone number for your building's location and the prescriptive package number for the package you selected. Copy the glazing area percentage, R-value, and U-value requirements specified in your selected package to the corresponding blanks on the right side of the worksheet. Write in the glazing area of your building and your proposed insulation R-values and glazing and door U-values on the left side of the worksheet. If the package you selected requires high-efficiency heating or cooling equipment, record the efficiency, make, and model number of the equipment you intend to install.

4. Check for Compliance

Your building complies if:

- your glazing area is less than or equal to the required glazing area
- all proposed insulation R-values are greater than or equal to all required insulation R-values
- all proposed glazing and door U-values are less than or equal to all required glazing and door U-values
- your heating and cooling equipment meets the requirements specified for the package you selected (see Footnote 9 on the back side of the prescriptive package tables).

Chapter 3

Instructions

The *Prescriptive Package Worksheet* in Attachment B can be used to document compliance with the insulation and window requirements of the MEC. The following instructions explain how to complete this worksheet. Figure 2 shows an example *Prescriptive Package Worksheet*. The numbers in Figure 2 identify the various locations on this worksheet that correspond to the following steps.

Step 1: Find Your Climate Zone

Examine the map for your state. Each state map is divided into climate zones that fall along county boundaries. The zones are shown graphically on each map along with an alphabetical listing of the counties and their corresponding zone numbers. Based on the county in which your building is to be located, determine your climate zone number.

Step 2: Select a Prescriptive Package

Locate the one-page table of prescriptive packages for the zone you identified in Step 1. Select a package for your building from this table. If your building meets the insulation R-value, glazing, and (sometimes) heating and cooling equipment efficiency requirements specified by the package you select, then the building complies with the MEC insulation and window requirements. Refer to the back side of the prescriptive package tables for notes that further clarify the requirements.

The glazing U-value and the glazing area percentage listed for each package are the maximum allowed for that package. The glazing area and U-value requirements for any package can be altered by using the *Glazing Area/U-Value Trade-Off Worksheet* in Attachment B (instructions are given on the worksheet).

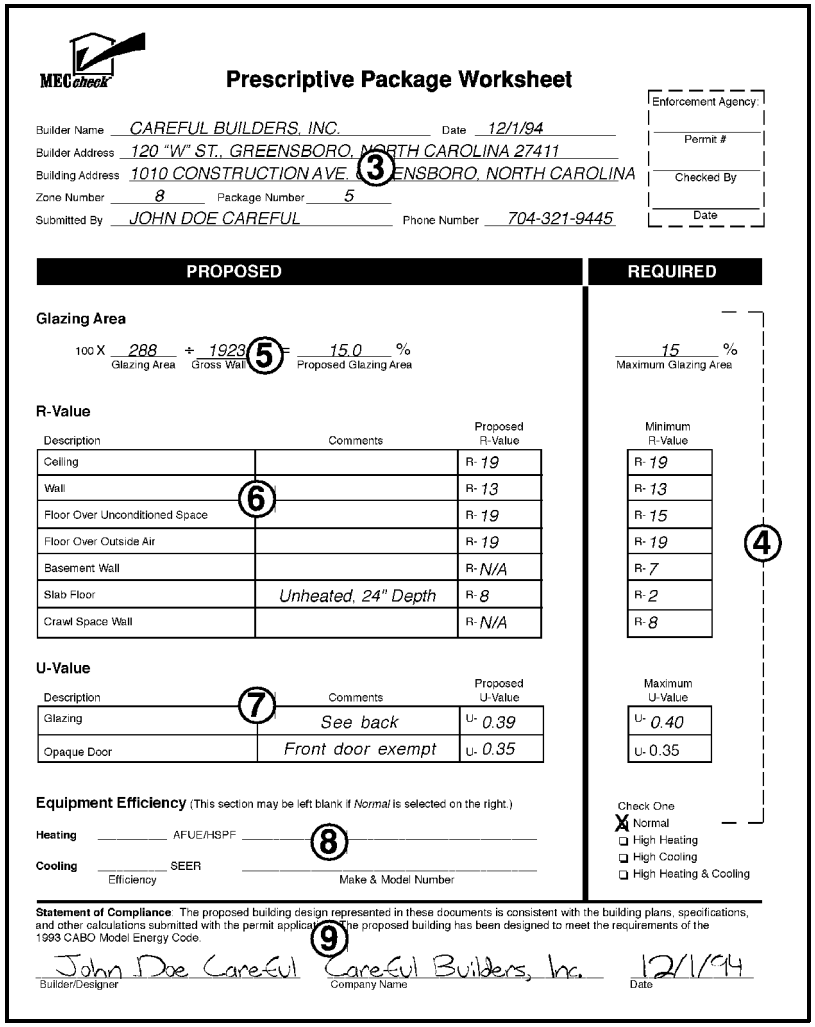
The insulation R-values listed for each package are the minimum allowed for that package. R-value requirements refer to the R-value of the insulation only. Wall and ceiling insulation R-values refer to the sum of the stud cavity insulation plus insulating sheathing (if used). For example, an R-16 wall requirement can be met with R-13 cavity insulation and R-3 sheathing. It is important to select a package consistent with the proposed framing used in the building. For example, it would be impossible to comply with a package specifying R-38 ceiling insulation (approximately 12 in. thick) if the building plans include a cathedral ceiling with 2x8 framing (approximately 7.5 in. thick).

Some of the packages specify high-efficiency heating equipment (*High Heating*), or high-efficiency cooling equipment (*High Cooling*), or a combination of both (*High Heat/Cool*). High-efficiency heating units have an annual fuel utilization efficiency (AFUE) of at least 90% or a heating seasonal performance factor (HSPF) of at least 7.8. High-efficiency cooling units have a seasonal energy efficiency ratio (SEER)

of at least 12.0. For example, if you intend to install a 10 SEER air conditioner and a 92% AFUE furnace, the *High Heating* packages would apply to your building, but *High Cooling* and *High Heat/Cool* packages would not. If you plan to install more than one piece of heating equipment or more than one piece of cooling equipment, the equipment with the lowest efficiency must meet or exceed the efficiency required by the selected package. AFUE, HSPF, and SEER ratings can be obtained from manufacturer data sheets or certified product directories.

Step 3: Complete the General Information Section

Fill in the information at the top of the *Prescriptive Package Worksheet*. Be sure to record your climate zone number and prescriptive package number.



Prescriptive Package Worksheet

Enforcement Agency: / Permit # / Checked By / Date

Builder Name: CAREFUL BUILDERS, INC. Date: 12/1/94
Builder Address: 120 "W" ST., GREENSBORO, NORTH CAROLINA 27411
Building Address: 1010 CONSTRUCTION AVE. (3) ENSBORO, NORTH CAROLINA
Zone Number: 8 Package Number: 5
Submitted By: JOHN DOE CAREFUL Phone Number: 704-321-9445

PROPOSED	REQUIRED

Glazing Area

100 X 288 (Glazing Area) ÷ 1923 (Gross Wall) (5) = 15.0 % (Proposed Glazing Area)

15 % Maximum Glazing Area

R-Value

Description	Comments	Proposed R-Value	Minimum R-Value
Ceiling		R-19	R-19
Wall	(6)	R-13	R-13
Floor Over Unconditioned Space		R-19	R-15
Floor Over Outside Air		R-19	R-19
Basement Wall		R-N/A	R-7
Slab Floor	Unheated, 24" Depth	R-8	R-2
Crawl Space Wall		R-N/A	R-8

(4)

U-Value

Description	Comments	Proposed U-Value	Maximum U-Value
Glazing (7)	See back	U-0.39	U-0.40
Opaque Door	Front door exempt	U-0.35	U-0.35

Equipment Efficiency (This section may be left blank if *Normal* is selected on the right.)

Heating _____ AFUE/HSPF (8) _____
Cooling _____ SEER _____
Efficiency / Make & Model Number

Check One
X Normal
❑ High Heating
❑ High Cooling
❑ High Heating & Cooling

Statement of Compliance The proposed building design represented in these documents is consistent with the building plans, specifications, and other calculations submitted with the permit application. The proposed building has been designed to meet the requirements of the 1993 CABO Model Energy Code. (9)

John Doe Careful / Careful Builders, Inc. / 12/1/94
Builder/Designer / Company Name / Date

Figure 2. Prescriptive Package Worksheet Step-by-Step

Step 4: Complete the Required Section

Copy the *Glazing Area* percentage from the prescriptive package you have chosen to the space labeled *Maximum Glazing Area*. Depending on the package you have selected, this percentage will be 12%, 15%, 18%, 22%, or 25% for single-family buildings or 15%, 20%, 25%, or 30% for multifamily buildings.

Copy the insulation R-value and glazing U-value requirements from the selected prescriptive package to the *Minimum R-Value* and *Maximum U-Value* sections of the worksheet. The required R-value for floors over outside air is the same as that for ceilings, so copy the ceiling R-value requirement from the selected prescriptive package to the *Minimum R-Value* box for floors over outside air. The slab R-value requirement is for unheated slabs. In all locations except Zone 1, add an additional R-2 if you intend to install a heated slab. A heated slab has ducts or hydronic heating elements in or under the slab.

If high-efficiency heating equipment is specified in the package you have chosen, put an "X" in the box labeled *High Heating*. If high-efficiency cooling equipment is specified in the package you have chosen, put an "X" in the box labeled *High Cooling*. If both are specified, put an "X" in the box labeled *High Heating & Cooling*. If normal heating and cooling efficiency is specified in the package you selected, put an "X" in the box labeled *Normal*.

Step 5: Complete the Proposed Glazing Area Section

Calculate the total area (ft^2) of all glazing assemblies (windows, sliding glass doors, skylights, etc.) located in the building envelope. The area of an assembly is the interior surface area of the entire assembly, including glazing, sash, curbing, and other framing elements. The nominal area or rough opening is acceptable for flat windows. The area of windows in the exterior walls of conditioned basements should be included. Windows in unconditioned basements are *NOT* included. Record the total area of all applicable assemblies in the space labeled *Glazing Area*.

Next, calculate the gross wall area (ft^2) and record this area in the space labeled *Gross Wall Area*. The gross wall area includes the following:

- all above-grade walls enclosing conditioned spaces (including attic kneewalls and skylight shafts)
- the peripheral edges of floors (the area of the band joist and subfloor between floors)
- walls of conditioned basements with an average depth less than 50% below grade (include the entire wall area -- even the below-grade portions). For further clarification, refer to the basement wall examples given in Step 6.
- all windows and doors (including windows and doors in conditioned basements).

Divide the glazing area by the gross wall area and multiply by 100 to determine the *Proposed Glazing Area* percentage.

Step 6: Complete the Proposed R-Value Section

Record the proposed R-value of the insulation to be installed in each applicable ceiling, wall, floor, basement wall, slab-edge, and crawl space wall component in the *Proposed R-Value* column of the worksheet.

Ceiling R-Value Proposed R-values for ceilings represent the sum of the cavity insulation plus insulating sheathing (if used). For ventilated ceilings, insulating sheathing must be placed between the conditioned space and the ventilated portion of the roof (typically applied to the trusses or rafters immediately behind the drywall or other ceiling finish material).

The ceiling R-value requirements do not assume a raised or oversized truss construction. If the insulation achieves the full insulation thickness over the exterior walls, R-30 insulation may be used to meet an R-38 insulation requirement and R-38 insulation may be used to meet an R-49 insulation requirement (see Footnote 3 on the back side of the prescriptive package tables). If you are taking credit for a raised or oversized truss, note this in the *Comments* section of the worksheet.

Wall R-Value R-values for walls represent the sum of the cavity insulation plus insulating sheathing (if used). The wall R-value requirements are for wood-frame and mass walls.[(a)] However, the packages may be adapted for metal-frame walls by using one of the equivalent cavity and sheathing insulation R-value combinations provided in Appendix C. The use of metal-frame walls should be noted in the *Comments* section of the worksheet.

Floor R-Value Floors over unconditioned space include floors over unconditioned crawl spaces, basements, and garages. Floors over outside air include floor cantilevers, the floor of an elevated building, and floors of overhangs (such as the floor above a recessed entryway or open carport). Floors over outside air must meet the ceiling R-value requirement.

Basement R-Value Basement walls that enclose conditioned spaces must be insulated from the top of the basement wall to 10 ft below ground level or to the basement floor, whichever is less. The MEC*check*™ Software enables you to trade off the basement wall insulation depth as well as the insulation R-value. If you intend to install insulation on both the exterior and interior of the wall, provide the sum of both R-values.

Walls of conditioned basements with an average depth 50% or more below grade are considered basement walls; walls over 50% above grade are considered above-

(a) The wall R-values listed in the Version 2.0 Prescriptive Packages were developed for wood-frame walls, but they can also be used for above-grade concrete, masonry, and log walls (referred to as mass walls). A mass wall R-value equivalency table which includes the MEC mass wall credit is planned for future versions.

grade walls and must meet the wall R-value requirement for the package. The following examples help to clarify the treatment of basements with wood kneewalls, walk-out basements, and basement walls constructed from specialty foundation systems.

Example 1: Wood Kneewalls

Assume a basement is to be constructed with 3-ft-high wood kneewalls built on a 5-ft-high concrete foundation. R-13 insulation will be installed in the wood kneewall cavities and R-5 rigid insulation will be installed on the concrete foundation walls. The wood kneewalls are completely above grade and fully insulated. The concrete foundation walls are 4 ft below grade and fully insulated.

Because each basement wall is at least 50% below grade, both the masonry foundation and the wood kneewalls must be insulated to at least the basement R-value requirement specified in the selected prescriptive package. If the basement wall R-value requirement in the selected prescriptive package is R-5 or less, both the wood kneewalls and the concrete foundation walls meet the requirement and you may enter R-5 for the proposed R-value of the basement walls. If, however, the requirement is greater than R-5, you will have to perform an area-weighted average U-value calculation using the *R-Value/U-Value Weighted Average Worksheet* to verify that the average basement wall R-value meets or exceeds the required R-value.

Example 2: Walk-Out Basement

Assume an 8-ft basement is to be built on a slope so that the front wall is 7 ft below grade and the rear wall is totally above grade. The ground level along both side walls is sloped so that approximately 50% of each wall is below grade. The rear basement wall will be wood-frame construction with R-19 insulation. The other three walls will be concrete walls with R-10 insulation. All four walls will be fully insulated.

Because the front and side walls are at least 50% below grade, they must be insulated to at least the basement R-value requirement specified in the selected prescriptive package. The rear wall is not 50% below grade, however, and is therefore subject to the above-grade wall requirement. Note that the basement floor along the rear wall should be considered a slab-on-grade component. Slab insulation should be installed along the basement floor for the length of the rear wall. The slab insulation must meet or exceed the slab R-value requirement specified for the selected package.

Example 3: Specialty Foundation Systems

Manufacturers of insulating foam concrete form systems and pre-manufactured concrete panels with integrated insulation generally supply R-value ratings for the entire wall, not just the insulation. Where the R-value of the insulation alone is not known, the manufacturer overall wall R-value rating may be used.

Slab R-Value The prescriptive package slab R-value requirements are for unheated slabs. Add an additional R-2 for heated slabs, except in Zone 1 which does not require slab insulation. For packages with a slab insulation requirement,

the insulation must extend a total linear distance of at least 24 in. in Zones 2-12 and 48 in. in Zones 13-19. In the *Comments* section, indicate whether the slab will be heated or unheated. A heated slab is a slab with ducts or hydronic heating elements in or under the slab. The MEC*check*™ Software enables you to trade off the slab perimeter insulation depth as well as the insulation R-value.

The insulation can be installed using any of the following configurations, but in all cases it must start at the top of the slab:

- The slab insulation extends from the top of the slab downward to the required depth.
- The slab insulation extends from the top of the slab downward to the bottom of the slab and then horizontally underneath the slab for a minimum total linear distance equal to or greater than the required depth.
- The slab insulation extends from the top of the slab downward to the bottom of the slab and then horizontally away from the slab for a minimum total linear distance equal to or greater than the required depth. The horizontal insulation must be covered by pavement or at least 10 in. of soil.

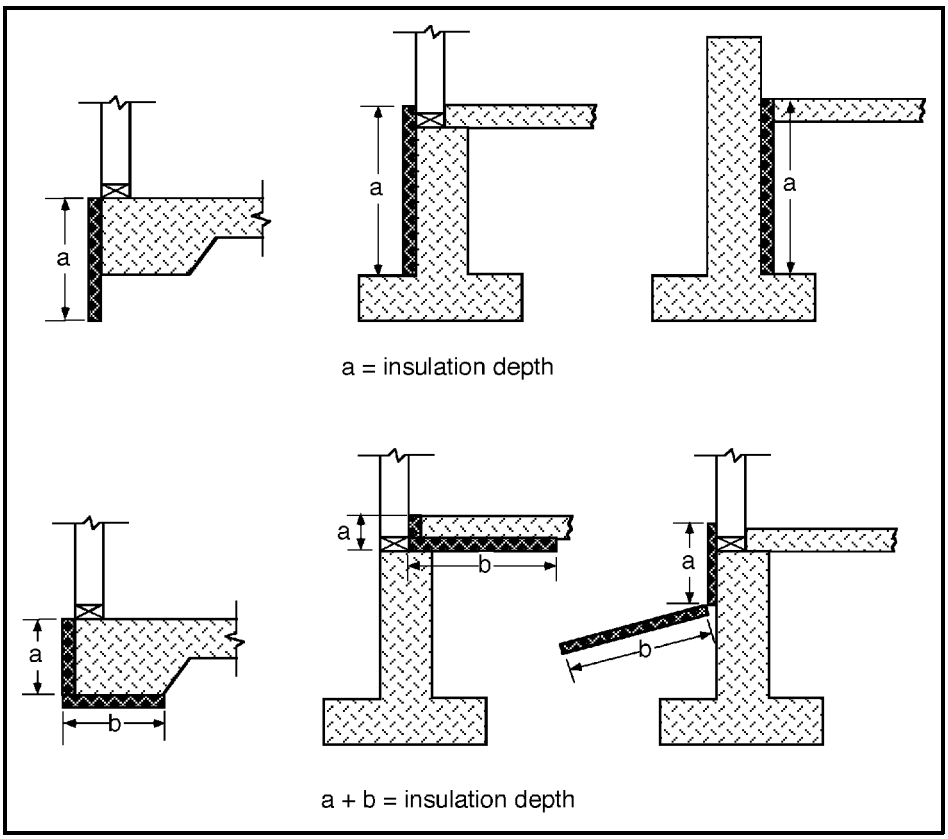


Figure 3. Slab Insulation Depth Requirement

The top edge of insulation installed between the exterior wall and the interior slab can be cut at a 45° angle away from the exterior wall.

Crawl Space Wall R-Value The crawl space wall R-value requirements are for walls of unventilated crawl spaces (i.e., not directly vented to the outside). The crawl space wall insulation must extend from the top of the wall to at least 12 in. below the outside finished grade. If the distance from the outside finished grade to the top of the footing is less than 12 in., the insulation must extend a total vertical plus horizontal distance of 24 in. from the outside finished grade.
Figure 4 illustrates the crawl space wall insulation depth requirements.

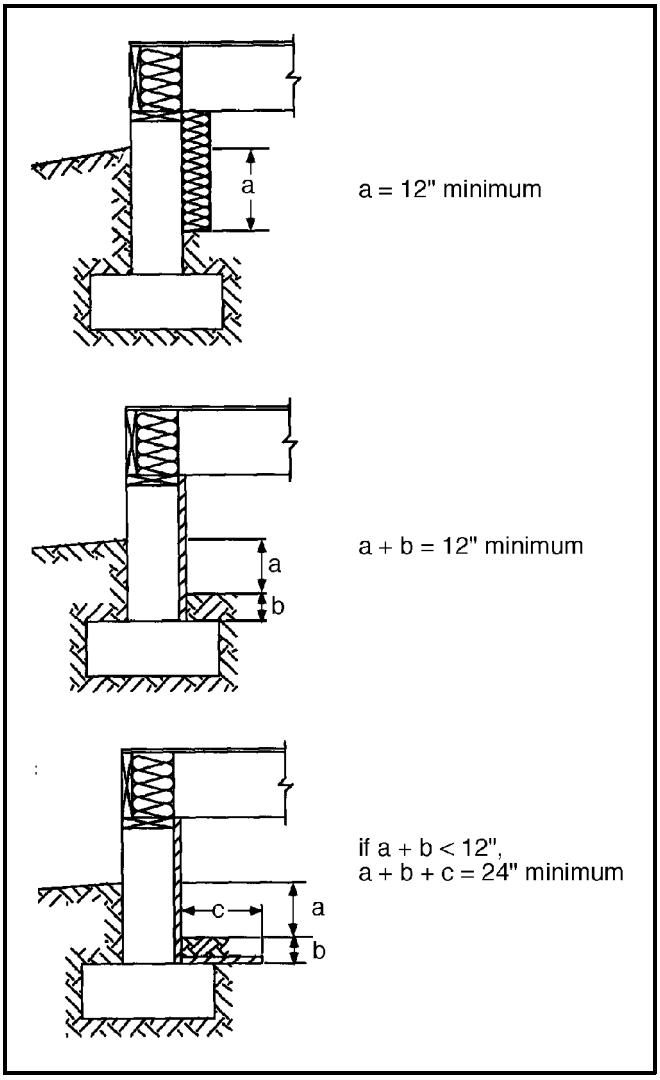


Figure 4. Crawl Space Wall Insulation Depth Requirement

Multiple R-Values Some components may consist of more than one R-value (e.g., part of the ceiling may be insulated to R-38 and part to R-19). If each component R-value is greater than or equal to the required R-value, record the lowest component R-value. However, if one of the R-values is less than the required R-value, perform an area-weighted average R-value calculation using the *R-Value/U-Value Weighted Average Worksheet*. If the resulting average R-value is greater than or equal to the required R-value, the component complies and the average R-value should be transferred to the *Prescriptive Package Worksheet*.

Step 7: Complete the Proposed U-Value Section

Glazing Record the proposed U-values for glazing assemblies (such as windows, skylights, and sliding glass doors) in the *Proposed U-Value* column of the worksheet. U-values for glazing should be tested and documented by the manufacturer in accordance with the NFRC[(a)] test procedure, taken from Table B-1 in Appendix B, or derived from an alternative test procedure or table accepted by your local jurisdiction. Center-of-glass U-values cannot be used.

Doors In the *Proposed U-Value* column of the worksheet, record the proposed U-values for all opaque doors in the building envelope. U-values for doors must be based on manufacturer data, taken from Table B-2 in Appendix B, or derived from an alternative test procedure or table accepted by your local jurisdiction. The U-value requirement for all doors in the building envelope (regardless of the prescriptive package chosen) is 0.35. The prescriptive package approach allows you to exclude one door from this requirement. If more than one door fails to meet the 0.35 U-value requirement, perform an area-weighted average U-value calculation using the *R-Value/U-Value Weighted Average Worksheet* located on the back side of the *Prescriptive Package Worksheet* (one door may also be excluded from this calculation). If a door contains glass and an aggregate U-value rating for that door is not available, include the glass area of the door with your glazing and use the opaque door U-value to determine compliance of the door.

Multiple U-Values Some buildings will use more than one glazing or door U-value (e.g., windows and sliding glass doors with different U-values may both be installed). If each U-value is less than or equal to the required U-value, record the lowest component U-value. However, if one of the U-values is too high, perform an area-weighted average U-value calculation using the *R-Value/U-Value Weighted Average Worksheet*. If the resulting average U-value is less than or equal to the required U-value, the component complies and the average U-value should be transferred to the *Prescriptive Package Worksheet*.

(a) National Fenestration Rating Council. *NFRC 100-91: Procedure for Determining Fenestration Product Thermal Properties*. Silver Spring, Maryland.

Step 8: Complete Equipment Efficiency Section

If the heating and cooling efficiency of the package you have selected is normal, leave this section blank. If high-efficiency heating or cooling equipment is specified in the package you select, record the proposed equipment efficiency in the space(s) labeled *Efficiency* and record the equipment make and model number in the space(s) labeled *Make and Model Number*. If you plan to install more than one piece of heating equipment or more than one piece of cooling equipment, you must enter the efficiency of the unit with the lowest rating.

Step 9: Check for Compliance

Compliance is achieved if

- the *Proposed Glazing Area* percentage is less than or equal to the *Maximum Glazing Area* percentage
- all R-values in the *Proposed R-Value* column are greater than or equal to the corresponding values in the *Minimum R-Value* column
- all glazing and door U-values in the *Proposed U-Value* column are less than or equal to the corresponding values in the *Maximum U-Value* column
- your selected package specifies *Normal* equipment; OR your package specifies *High Heating* equipment and your proposed heating equipment has an AFUE of at least 90% or an HSPF of at least 7.8; OR your package specifies *High Cooling* equipment and your proposed heating equipment has a SEER of at least 12; OR your package specifies *High Heat/Cool* and your proposed equipment meets both of the above-listed requirements.

If all components do not meet the requirements of the selected prescriptive package, you can select another package, modify the design to meet the selected package requirements, or select another compliance approach.

When you have completed the *Prescriptive Package Worksheet*, sign and date the worksheet in the blanks provided. Transfer the insulation R-values and glazing and door U-values to the building plans or specifications. If you are taking credit for high-efficiency equipment, also transfer the efficiency, make, and model number of the equipment.

Chapter 4

Example

The prescriptive package approach is illustrated in this section. Assume that you plan to build the single-family house shown in Figure 5 on a lot located in Greensboro, North Carolina. Greensboro is in Guilford County and is designated as Zone 8 on the North Carolina state map. For the purposes of this example, assume you have chosen Package 5 from the single-family prescriptive packages offered for Zone 8. Compliance for a multifamily building is handled in much the same way, only packages should be selected from the tables developed specifically for multifamily buildings.

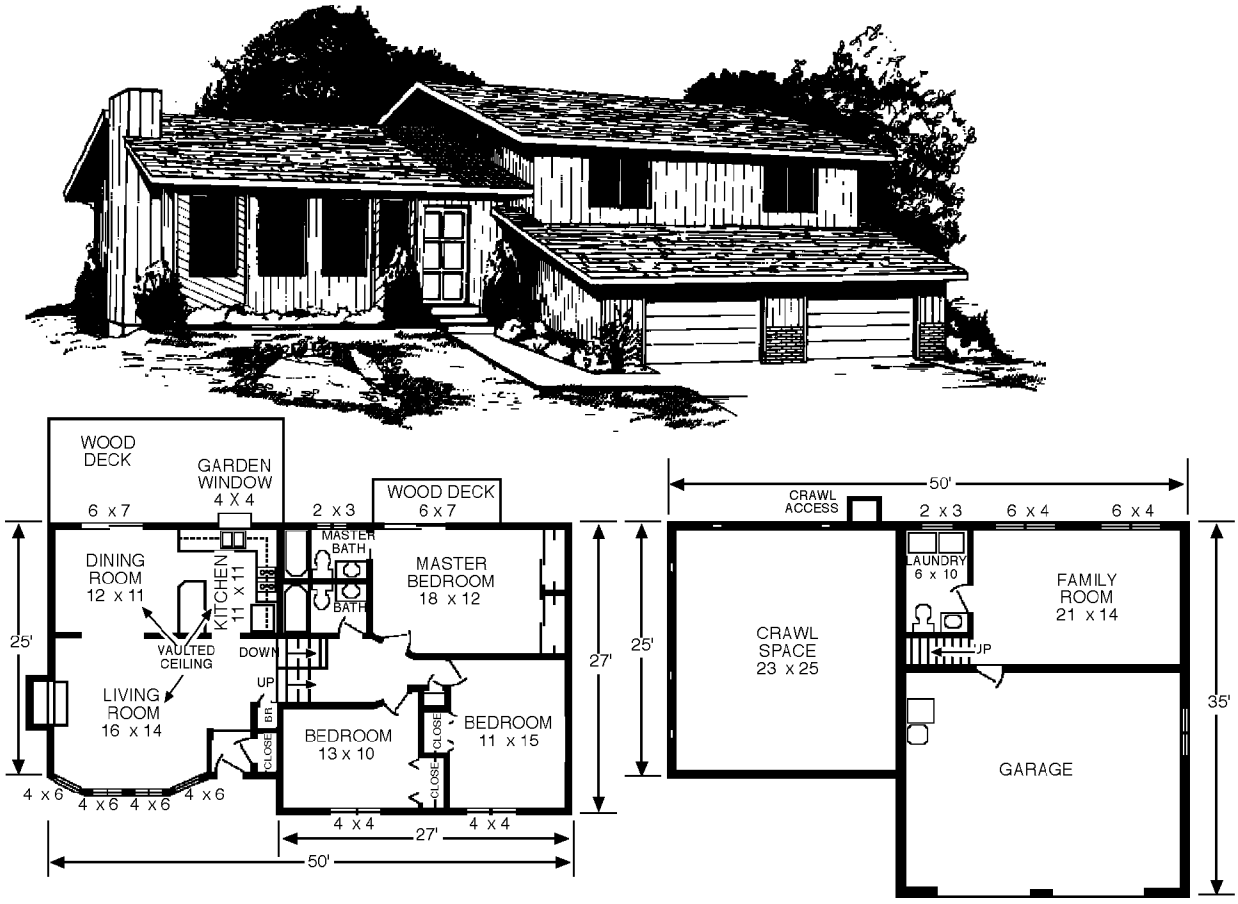


Figure 5. Example House

Table 1 lists the components that make up the building envelope, the dimensions of some of these components, and the proposed insulation R-values and window and door U-values. Figure 6 shows how to determine the proposed and required R-values recorded on the *Prescriptive Package Worksheet*.

Table 1. Example House Specifications

Building Component	Area (ft^2)	Insulation Level
Ceilings		
With Attic	N/A	R-38
Cathedral	N/A	R-19
Walls (2x4 @ 16-in. O.C.)		
Without Sheathing[a]	276 (gross)	R-13
With Sheathing	1647 (gross)	R-19 (R-13 cavity + R-6 sheathing)
Windows	204	U-0.38
Sliding Glass Doors	84	U-0.43
Doors		
Entrance	N/A	U-0.54
Garage to Family Room	N/A	U-0.35
Floors		
Over Garage	N/A	R-19
Over Crawl Space	N/A	R-19
Slab-On-Grade	N/A	R-8
Bay Window Floor	N/A	R-19

(a) Walls without sheathing are located between the family room and the garage, the laundry room and the crawl space, and the garage and the living room.

Determine Which Components Are Part of the Building Envelope

The advantage of the prescriptive package approach over the trade-off approach and the software approach is that you are not required to know the areas of many of the building components (Table 1 lists only the areas that you will need). You *DO* need to compute a glazing area percentage, however, and this computation requires the gross wall area and total glazing area. Before you can determine the gross wall area of your building, you must first determine which walls are part of the building envelope and which are not. Only the building components that are part of the building envelope are relevant.

Building envelope components are those that separate conditioned spaces (heated or cooled rooms) from outside air or from unconditioned spaces (rooms that are neither heated nor cooled). Walls, floors, and other building components separating two conditioned spaces are *NOT* part of the building envelope.

Walls In this example, the garage is unconditioned, so the exterior garage walls are not part of the building envelope. The wall between the conditioned family room and the unconditioned garage is part of the building envelope. Likewise, the wall between the garage and the living room is part of the building envelope.

Part of the laundry room wall separates the laundry room from the crawl space and the other part separates the laundry room from the kitchen. The portion adjacent to the crawl space is part of the building envelope because it separates the conditioned laundry room from the unconditioned crawl space. The portion adjacent to the kitchen can be ignored. Likewise, the wall between the upstairs bathrooms and the kitchen and the wall between the center bedroom and the living room are not part of the building envelope. Portions of both of these walls are also adjacent to outside air, and those portions are part of the building envelope. The following walls are part of the building envelope and their areas need to be included when computing the gross wall area:

- all walls between interior conditioned space and outside air
- the wall between the family room and the garage
- the wall between the garage and the living room
- the wall between the laundry room and the crawl space.

Floors The floor of the bay window is considered a floor over outside air and must meet the ceiling R-value requirement. The floors over the garage and the crawl space are floors over unconditioned space, and must meet the floor R-value requirement. Because the floor over the crawl space is to be insulated, the crawl space is not part of the building envelope and the crawl space walls are not considered. The family room has a slab-on-grade floor which must meet the slab perimeter R-value requirement.

Glazing and Doors There are two sliding glass doors in the building envelope -- one leading from the dining room to the larger deck and one leading from the master bedroom to the smaller deck. There are two opaque doors in the building envelope -- the front entry door and the door leading from the garage into the family room.

Complete the Required Section

Transfer all of the requirements specified by Package 5 to the right side of the *Prescriptive Package Worksheet* (in the *REQUIRED* section). Record the maximum allowed glazing area (15% in this example) in the space labeled *Maximum Glazing Area*. Transfer the R-value and U-value requirements from Package 5 to the boxes under the *Minimum R-Value* and *Maximum U-Value* columns. Note that floors over outside air must meet the prescriptive package ceiling R-value requirement (R-19 in this example), so the ceiling requirement is listed across from the *Floor Over Outside Air* component. The U-value requirement for all doors is 0.35, so this value has been entered on the worksheet for you.

Package 5 specifies *Normal* heating equipment efficiency, so place an "X" in the *Normal* box.

Complete the Proposed Glazing Area Section

The glazing area (288 ft^2) is the sum of all glazing assemblies, including the sliding glass doors and the garden window. The gross wall area (1923 ft^2) equals the sum of the wall area, windows, doors, and sliding glass doors. The glazing area percentage is 100 times the glazing area divided by the gross wall area:

$$Glazing\ Area\ Percentage = 100\ x\ \frac{288}{1923} = 15.0\%$$

Complete the Proposed R-Value Section

Record the R-values of the insulation that you intend to install in the *Proposed R-Value* column. These proposed values are listed in Table 1. The example house does not have a basement, so place "N/A" in the *Proposed R-Value* column for basement walls to indicate that they are not applicable. Although there is a crawl space, it is ventilated and the insulation will be installed on the floor over the crawl space, so place "N/A" in the *Proposed R-Value* column for crawl space walls as well.

Ceiling R-Value Two ceiling insulation R-values will be installed in the house. R-38 insulation is proposed for the flat ceiling below a vented attic and R-19 insulation is proposed for the vaulted ceiling. Package 5 requires a minimum of R-19 ceiling insulation. Because the lowest proposed R-value (R-19 for the vaulted ceiling) is greater than or equal to the minimum required (also R-19), you may enter R-19 in the *Proposed R-Value* column for ceilings. You do not need to calculate an average R-value for ceilings. If the required ceiling R-value had been greater (e.g., R-21), an area-weighted average R-value calculation would have been necessary to show compliance with the requirements of Package 5.

R-19 insulation is proposed for the floor of the bay window (floors over outside air are subject to the ceiling R-value requirement). Enter R-19 in the *Proposed R-Value* column for floors over outside air.

Wall R-Value Most of the walls will be insulated with R-13 cavity insulation and covered with R-6 insulating sheathing. Cavity insulation and sheathing can be added together -- in this case resulting in R-19. However, R-13 cavity insulation *without* sheathing will be installed on walls between

- the family room and the garage
- the laundry room and the crawl space
- the garage and the living room.

Package 5 requires a minimum of R-13 wall insulation. Because the lowest proposed wall R-value (R-13) is greater than or equal to the minimum required (also R-13), you are not required to calculate an average R-value for walls. Enter R-13 in the *Proposed R-Value* column for walls.

Floor R-Value The floor above the crawl space and the floor over the garage are both floors over unconditioned space. Both of these floors will be insulated with R-19 batt insulation. Enter R-19 for the *Floor Over Unconditioned Space* component.

Slab R-Value Enter R-8 for the *Slab Floor* component. In the *Comments* column, indicate that the slab will be unheated. In all locations except Zone 1, heated slabs have more stringent requirements than unheated slabs (see Footnote 7 on the back side of the prescriptive package tables). Also indicate the depth of the insulation you intend to install (slab insulation must extend 24 in. in Zones 2-12 and 48 in. in Zones 13-19).

Complete the Proposed U-Value Section

Glazing U-Value Two different glazing U-values are proposed. The windows have a U-value of 0.38 and the sliding glass doors have a U-value of 0.43, both of which have been rated and labeled by the manufacturer in accordance with the NFRC test procedure. Because 0.43 is greater than the maximum U-value specified in Package 5 (0.40), you must calculate an area-weighted average U-value. Complete the *R-Value/U-Value Weighted Average Worksheet* and transfer the results to the front of the *Prescriptive Package Worksheet*. Figure 6 shows the portion of the *R-Value/U-Value Weighted Average Worksheet* used to calculate the average glazing U-value for this house (0.39). If both proposed U-values had been less than or equal to the required U-value, then the weighted-average computation would not have been necessary and you could have recorded the higher of the two U-values.

Door U-Value The U-value requirement for all opaque doors (regardless of the prescriptive package chosen) is 0.35. The entry door has a U-value of 0.54 and the door from the garage to the family room has a U-value of 0.35. Therefore, the entry door does not meet the door U-value requirement and the garage door meets it exactly. On average, the proposed door U-values will clearly not comply with this or any other package. However, one door may be exempted from this requirement (see Note b on the back side of the prescriptive package tables). This exemption allows one door to exceed the 0.35 U-value requirement. Because the entry door of the example house may be exempted and the garage door complies, record the U-value of the garage door (0.35) as the *Proposed U-Value* for the *Door* component. If more than one door had exceeded the door U-value requirement, an area-weighted average would have been necessary to show compliance.

Complete the Proposed Heating Efficiency Section

Package 5 does not require high-efficiency equipment. You may leave this section blank.

Check for Compliance

To verify compliance with the requirements of Prescriptive Package 5 for Zone 8, compare the *PROPOSED* and *REQUIRED* sections of the *Prescriptive Package Worksheet*.

- The *Proposed Glazing Area* is less than or equal to the allowed *Maximum Glazing Area*.
- The *Proposed R-Values* for each of the building components are greater than or equal to the required *Minimum R-Values*.
- The *Proposed U-Values* for glazing and doors are less than or equal to the required *Maximum U-Values*.
- There are no equipment efficiency requirements.

You have demonstrated that your building design complies with the MEC insulation and window requirements (congratulations!). Sign and date the worksheet.

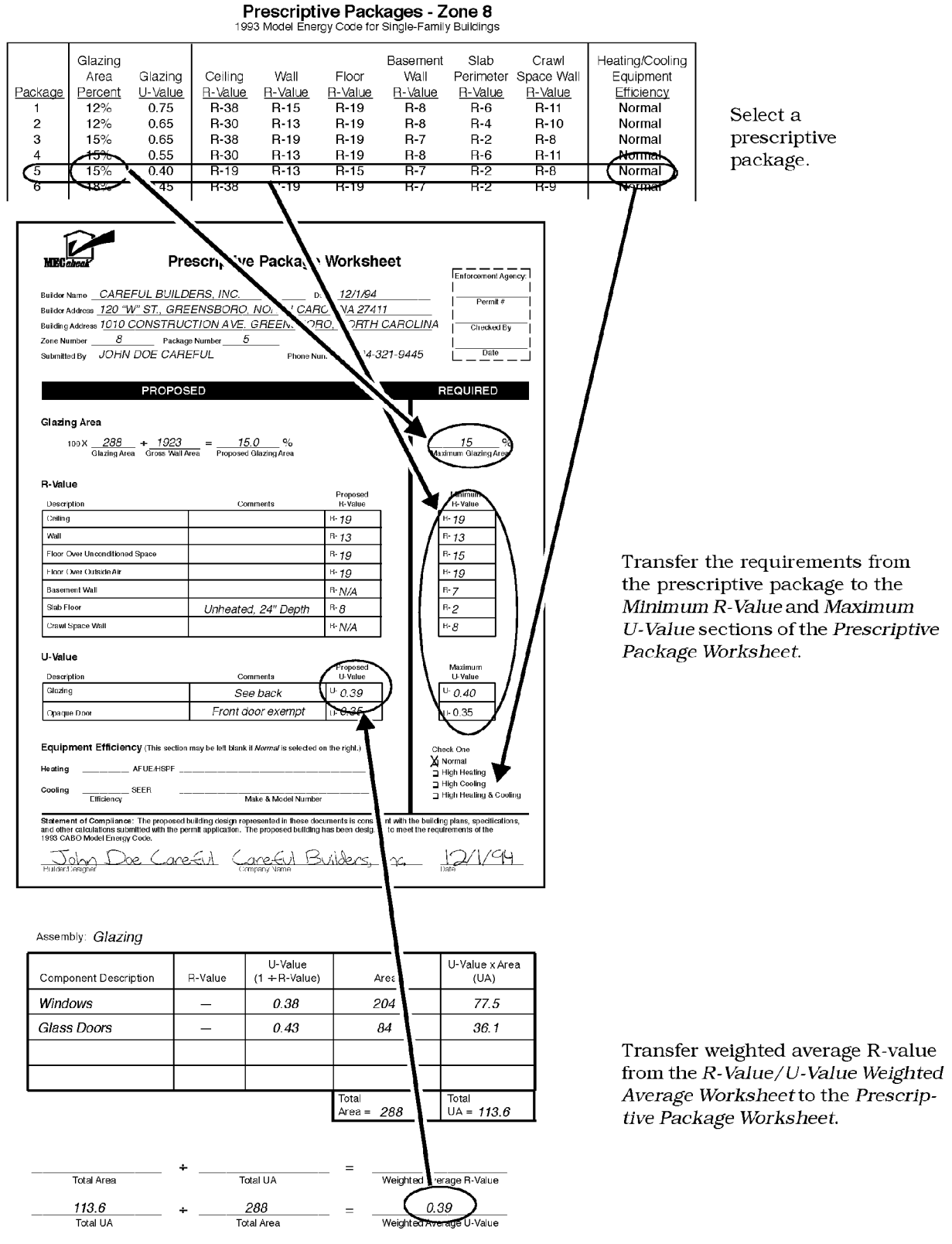


Figure 6. Determining Proposed and Required R-Values and U-Values

Appendix A

Definitions

Addition The MEC applies to new residential buildings and additions to existing buildings. Additions can be shown to comply by themselves without reference to the rest of the building. Alternatively, the entire building (the existing building plus the new addition) can be shown to comply.

Basement Wall Basement walls that enclose conditioned spaces are part of the building envelope. Basement wall refers to the opaque portion of the wall (excluding windows and doors). To be considered a basement wall, the average gross wall area (including openings) must be at least 50% below grade. For walls less than 50% below grade, include the entire opaque wall area as part of the above-grade walls.

Building Envelope The building envelope includes all components of a building that enclose conditioned spaces (see the definition of conditioned space). Building envelope components separate conditioned spaces from unconditioned spaces or from outside air. For example, walls and doors between an unheated garage and a living area are part of the building envelope; walls separating an unheated garage from the outside are not. Although floors of conditioned basements and conditioned crawl spaces are technically part of the building envelope, the MEC does not specify insulation requirements for these components and they can be ignored.

Ceiling The ceiling requirements apply to portions of the roof and/or ceiling through which heat flows. Ceiling components include the interior surface of flat ceilings below attics, the interior surface of cathedral or vaulted ceilings, and skylights. The ceiling requirements also apply to floors over outside air, including floor cantile-vers, floors of an elevated home, and floors of overhangs (such as the floor above a recessed entryway or open carport).

Conditioned Space A space is conditioned if heating and/or cooling is deliberately supplied to it or is indirectly supplied through uninsulated surfaces of water or heating equipment or through uninsulated ducts. For example, a basement with registers or heating devices designed to supply heat is conditioned.

Crawl Space The MEC*check*™ crawl space wall insulation requirements are for the exterior walls of unventilated crawl spaces (i.e. not directly vented to the outside) below uninsulated floors. A crawl space wall component includes the opaque portion of a wall that encloses a crawl space and is partially or totally below grade.

Door Doors include all openable opaque assemblies located in exterior walls of the building envelope. Doors with glass can be treated as a single door assembly, in which case an aggregate U-value (a U-value that includes both the glass and opaque area) must be used; OR the glass area of the door can be included with the other glazing and an opaque door U-value can be used to determine compliance of the door.

Dwelling Unit A single housekeeping unit of one or more rooms providing complete, independent living facilities, including permanent provisions for living, sleeping, eating, cooking and sanitation.

Envelope See Building Envelope

Glazing Glazing is any translucent or transparent material in exterior openings of buildings, including windows, skylights, sliding glass doors, the glass areas of opaque doors, and glass block.

Glazing Area The area of a glazing assembly is the interior surface area of the entire assembly, including glazing, sash, curbing, and other framing elements. The nominal area or rough opening is also acceptable for flat windows and doors.

Floor Area Not all floors in a building are considered when computing the floor area for compliance purposes:

- Floors over unconditioned spaces (such as floors over an unheated garage, basement, or crawl space) must be insulated.
- Floors over outside air (such as floors of overhangs and floors of an elevated home) must also be insulated but are subject to the ceiling requirements rather than the floor over unconditioned space requirements.
- In most locations, slab-on-grade floors of conditioned spaces must be insulated along the slab perimeter.
- Floors of basements and crawl spaces are not subject to an insulation requirement and do not have to be included as a building envelope component, even if the basement or crawl space is conditioned. In some cases, however, crawl space wall insulation is required to extend down from the top of the wall to the top of the footing and then horizontally a short distance along the floor.
- Floors separating two conditioned spaces are not subject to an insulation requirement and do not have to be included as a building envelope component.

Gross Wall Area The gross wall area includes the opaque area of above-grade walls, the opaque area of walls of conditioned basements less than 50% below grade (including the below-grade portions), all windows and doors (including windows and doors of conditioned basements), and the peripheral edges of floors.

Multifamily A multifamily building is a residential building three stories or less in height that contains three or more attached dwelling units. Multifamily buildings include apartments, condominiums, townhouses, and rowhouses. Hotels and motels are considered commercial rather than residential buildings.

Net Wall Area The net wall area includes the opaque wall area of all above-grade walls enclosing conditioned spaces, the opaque area of conditioned basement walls less than 50% below grade (including the below-grade portions), and peripheral edges of floors. The net wall area does not include windows, doors, or other such openings, as they are treated separately.

Opaque Areas Opaque areas as referenced in this guide include all areas of the building envelope except openings for windows, skylights, doors, and building service systems. For example, although solid wood and metal doors are opaque, they should not be included as part of the opaque wall area (also referred to as the net wall area).

Raised Truss Raised truss refers to any roof/ceiling construction that allows the insulation to achieve its full thickness over the exterior walls. Several constructions allow for this, including elevating the heel (sometimes referred to as an energy truss, raised-heel truss, or Arkansas truss), use of cantilevered or oversized trusses, lowering the ceiling joists, or framing with a raised rafter plate.

R-Value R-value ($h \cdot ft^2 \cdot {}^\circ F/Btu$) is a measure of thermal resistance, or how well a material or series of materials resists the flow of heat. R-value is the reciprocal of U-value:

$$R\text{-}Value = \frac{1}{U\text{-}Value}$$

Single Family As defined by the MEC, a single-family building is a detached one- or two-family residential building.

Slab Edge Slab edge refers to the perimeter of a slab-on-grade floor, where the top edge of the slab floor is above the finished grade or 12 in. or less below the finished grade.

U-Value U-value ($Btu/h \cdot ft^2 \cdot {}^\circ F$) is a measure of how well a material or series of materials conducts heat. U-values for window and door assemblies are the reciprocal of the assembly R-value:

$$U\text{-}Value = \frac{1}{R\text{-}Value}$$

For other building assemblies (such as a wall), the R-value used in the above equation is the R-value of the entire assembly, not just the insulation.

Appendix B

Glazing and Door U-Values

The glazing and opaque door U-value tables provide default U-values for glazing and doors based on the glazing or door features. The U-values in these tables can be used in the absence of NFRC-labeled U-values or manufacturer data.

Glazing and doors cannot receive credit for features that cannot be clearly detected, such as argon gas fills and low-emissivity (low-E) coatings. Windows with these features may achieve much lower U-values than those listed in Table B-1. For example, a double-pane wood or vinyl window with low-E glass may have a U-value around 0.38. The same window with argon gas may be rated at 0.34. Therefore, it may be advantageous to use test U-values for these types of windows.

Where a composite of materials from two different product types is used, the window or door must be assigned the higher U-value.

Table B-1. U-Values for Windows, Glazed Doors, and Skylights

Frame/Glazing Features	Single Pane	Double Pane
Metal Without Thermal Break		
Operable	1.30	0.87
Fixed	1.17	0.69
Door	1.26	0.80
Skylight	2.02	1.30
Metal With Thermal Break		
Operable	1.07	0.67
Fixed	1.11	0.63
Door	1.10	0.66
Skylight	1.93	1.13
Metal-Clad Wood		
Operable	0.98	0.60
Fixed	1.05	0.58
Door	0.99	0.57
Skylight	1.50	0.88
Wood/Vinyl		
Operable	0.94	0.56
Fixed	1.04	0.57
Door	0.98	0.56
Skylight	1.47	0.85
Glass Block Assemblies	0.60	

Table B-2. U-Values for Non-Glazed Doors

Steel Doors		
Without Foam Core	0.60	
With Foam Core	0.35	
Wood Doors	**Without Storm**	**With Storm**
Panel With 7/16-in. Panels	0.54	0.36
Hollow Core Flush	0.46	0.32
Panel With 1 1/8-in. Panels	0.39	0.28
Solid Core Flush	0.40	0.26

Appendix C

Metal-Frame Wall Equivalent R-Values

The MEC*check*™ Prescriptive Packages give R-value requirements for wood-frame walls. Metal-frame walls can comply with these requirements if equivalent cavity and sheathing insulation R-values are selected from the following tables. Use the table below for 16-in. O.C. metal-frame wall constructions. Use the table on the back side for 24-in. O.C. metal-frame wall constructions.

The left column lists the wood-frame wall R-value requirements specified in the prescriptive packages. The right column lists equivalent metal-frame wall cavity and sheathing R-value requirements. An equivalent metal wall must be insulated to one of the cavity plus sheathing R-value combinations listed to the right of the wood-frame wall requirement.

Example: A metal-frame house is being built to the specifications of Prescriptive Package 7 in Zone 8. The wood-frame wall R-value requirement for this package is R-13. The metal-frame walls are to be 16-in. O.C. construction with R-5 sheathing. The first table below indicates that R-15 cavity insulation must be installed. The other acceptable combinations are R-11 cavity insulation with R-7 sheathing and R-21 cavity insulation with R-4 sheathing.

Table C-1. 16-in. O.C. Metal-Frame Wall Equivalent R-Values

Wood-Frame Wall R-Value	**Equivalent Metal-Frame Wall Cavity and Sheathing R-Value**[(a)]
R-11	R-0+R-10, R-11+R-5, R-15+R-4, R-21+R-3
R-13	R-11+R-6, R-15+R-5, R-21+R-4
R-14	R-11+R-7, R-15+R-6, R-19+R-5
R-15	R-11+R-7, R-19+R-6, R-25+R-5
R-16	R-11+R-9, R-15+R-8, R-21+R-7
R-17	R-11+R-10, R-15+R-9, R-21+R-8
R-18	R-13+R-10, R-19+R-9, R-25+R-8
R-19	R-15+R-10, R-21+R-9
R-20	R-19+R-10, R-25+R-9
R-21	R-25+R-10

(a) The cavity insulation R-value requirement is listed first, followed by the sheathing R-value requirement.

Table C-2. 24-in. O.C. Metal-Frame Wall Equivalent R-Values

Wood-Frame Wall R-Value	**Equivalent Metal-Frame Wall Cavity and Sheathing R-Value**[(a)]
R-11	R-0+R-10, R-11+R-4, R-13+R-3, R-19+R-2, R-25+R-0
R-13	R-11+R-5, R-15+R-4, R-19+R-3, R-25+R-2
R-14	R-11+R-6, R-13+R-5, R-19+R-4, R-25+R-3
R-15	R-11+R-6, R-15+R-5, R-19+R-4, R-25+R-3
R-16	R-11+R-8, R-15+R-7, R-19+R-6, R-25+R-5
R-17	R-11+R-9, R-13+R-8, R-19+R-7, R-25+R-6
R-18	R-11+R-10, R-13+R-9, R-15+R-8, R-21+R-7
R-19	R-11+R-10, R-15+R-9, R-19+R-8, R-25+R-7
R-20	R-13+R-10, R-15+R-9, R-21+R-8
R-21	R-15+R-10, R-19+R-9, R-25+R-8

(a) The cavity insulation R-value requirement is listed first, followed by the sheathing R-value requirement.

Appendix D

The Building Envelope

The MEC requirements are intended to limit heat loss and air leakage through the building envelope. The building envelope includes all of the building components that separate conditioned spaces (conditioned space is defined in Appendix A) from unconditioned spaces or from outside air. For example, the walls and doors between an unheated garage and a living area are part of the building envelope; the walls separating an unheated garage from the outside are not. Walls, floors, and other building components separating two conditioned spaces (such as an interior partition wall) are *NOT* part of the building envelope, nor are common or party walls which separate dwelling units in multifamily buildings.

You can think of the building envelope as the boundary separating the inside from the outside and through which heat is transferred. Areas that have no heating or cooling sources are considered to be outside the building envelope. A space is conditioned if heating and/or cooling is deliberately supplied to it or is indirectly supplied through uninsulated surfaces of water or heating equipment or through uninsulated ducts.

To use the MEC*check*™ materials, you must specify proposed insulation levels for ceiling, wall, floor, basement wall, slab-edge, and crawl space wall components located in the building envelope. In some cases, it may be unclear how to classify a given building element. For example, are skylight shafts considered a wall component or a ceiling component? The following table can be used to help determine how a given building envelope assembly should be entered in the MEC*check*™ materials.

Table D-1. Building Envelope Components

Ceiling Components

Ceiling	Flat ceilings Cathedral or vaulted ceilings Dormer roofs Bay window roofs Overhead portions of an interior stairway to an attic Attic hatches
Floors Over Outside Air[(a)]	Floors of overhangs (such as the floor above a recessed entryway or carport) Floor cantilevers Floors of an elevated home
Skylights	Skylight assemblies

(a) The insulation requirements for floors over outside air are the same as those for ceilings.

Wall Components

Wall	Opaque portions of above-grade walls Basement walls and kneewalls less than 50% below grade Peripheral edges of floors Gables walls bounding conditioned space Dormer walls Roof or attic kneewalls Through-wall chimneys Walls of an interior stairway to an unconditioned basement Skylight shafts
Glazing	Windows (including basement windows) Sliding glass doors Glass block Transparent portions of doors
Door	Opaque portions of all doors (including basement doors)

Floor and Foundation Components

Floor Over Unconditioned Space	Floors over an unconditioned crawl space, basement, garage, or similar unconditioned space
Basement Wall	Opaque portions of basement walls 50% or more below grade and basement kneewalls (if part of a basement wall 50% or more below grade)
Slab Floor	Perimeter edges of slab-on-grade floors
Crawl Space Wall	Walls of unventilated crawl spaces below uninsulated floors

Appendix E

Counties By Climate Zone

County	Zone
ALABAMA	
Autauga	6
Baldwin	4
Barbour	5
Bibb	6
Blount	7
Bullock	5
Butler	5
Calhoun	6
Chambers	6
Cherokee	7
Chilton	6
Choctaw	5
Clarke	5
Clay	7
Cleburne	7
Coffee	4
Colbert	8
Conecuh	5
Coosa	6
Covington	4
Crenshaw	5
Cullman	7
Dale	4
Dallas	5
De Kalb	8
Elmore	6
Escambia	4
Etowah	7
Fayette	7
Franklin	8
Geneva	4
Greene	5
Hale	5
Henry	4
Houston	4
Jackson	8
Jefferson	6
Lamar	7
Lauderdale	8
Lawrence	8
Lee	6
Limestone	8
Lowndes	5
Macon	6
Madison	8
Marengo	5
Marion	7
Marshall	8
Mobile	4
Monroe	5
Montgomery	6
Morgan	8
Perry	5
Pickens	6
Pike	5
Randolph	7
Russell	5
Shelby	6
St Clair	6
Sumter	5
Talladega	6
Tallapoosa	6
Tuscaloosa	6
Walker	6
Washington	5
Wilcox	5
Winston	7
ALASKA BUROUGHS AND REAA's	
Adak Region	16
Alaska Gateway	19
Aleutian Region	17
Aleutians East	17
Anchorage	17
Annette Island	15
Bering Straits	19
Bristol Bay	17
Chatham	16
Chugach	17
Copper River	18
Delta/Greely	18
Denali	18
Fairbanks N. Star	18
Haines	16
Iditarod Area	19
Juneau	16
Kashunamiut	18
Kenai Peninsula	17
Ketchikan Gateway	15
Kodiak Island	16
Kuspuk	18
Lake & Peninsula	17
Lower Kuskokwim	18
Lower Yukon	18
Matanuska-Susitna	17
North Slope	19
Northwest Arctic	19
Pribilof Islands	17
Sitka	15
Southeast Island	15
Southwest Region	17
Yakutat	17
Yukon Flats	19
Yukon-Koyukuk	19
Yupiit	18
ARIZONA	
Apache	13
Cochise	6
Coconino	14
Gila	8
Graham	6
Greenlee	6
La Paz	3
Maricopa	3
Mohave	7
Navajo	10
Pima	4
Pinal	4
Santa Cruz	6
Yavapai	10
Yuma	3
ARKANSAS	
Arkansas	6
Ashley	6
Baxter	9
Benton	9
Boone	9
Bradley	6
Calhoun	6
Carroll	9
Chicot	6
Clark	6
Clay	8
Cleburne	8
Cleveland	6
Columbia	6
Conway	7
Craighead	8
Crawford	8
Crittenden	7
Cross	7
Dallas	6
Desha	6
Drew	6
Faulkner	7
Franklin	8
Fulton	8
Garland	7
Grant	6
Greene	8
Hempstead	7
Hot Spring	7
Howard	7
Independence	8
Izard	8
Jackson	8
Jefferson	6
Johnson	8
Lafayette	6
Lawrence	8
Lee	7
Lincoln	6
Little River	6
Logan	7
Lonoke	7
Madison	9
Marion	9
Miller	6
Mississippi	8
Monroe	7
Montgomery	8
Nevada	6
Newton	9
Ouachita	6
Perry	7
Phillips	7
Pike	7
Poinsett	8
Polk	8
Pope	8
Prairie	7
Pulaski	7
Randolph	8
Saline	7
Scott	7
Searcy	9
Sebastian	8
Sevier	7
Sharp	8
St Francis	7
Stone	9
Union	6
Van Buren	8
Washington	9
White	7
Woodruff	7
Yell	7
CALIFORNIA	
Alameda	6
Alpine	15
Amador	8
Butte	6
Calaveras	8
Colusa	6
Contra Costa	6
Del Norte	9
El Dorado	8
Fresno	6
Glenn	6
Humboldt	9
Imperial	3
Inyo	9
Kern	5
Kings	6
Lake	8
Lassen	13
Los Angeles	4
Madera	6
Marin	6
Mariposa	8
Mendocino	8
Merced	6
Modoc	15
Mono	15
Monterey	6
Napa	6
Nevada	11
Orange	4
Placer	8
Plumas	13
Riverside	4
Sacramento	6
San Benito	6
San Bernardino	4
San Diego	3
San Francisco	6
San Joaquin	6
San Luis Obispo	6
San Mateo	6
Santa Barbara	5
Santa Clara	6
Santa Cruz	6
Shasta	6
Sierra	11
Siskiyou	11
Solano	6
Sonoma	6
Stanislaus	6
Sutter	6
Tehama	6
Trinity	9
Tulare	6
Tuolumne	8
Ventura	4
Yolo	6
Yuba	6
COLORADO	
Adams	13
Alamosa	16
Arapahoe	13
Archuleta	16
Baca	11
Bent	11
Boulder	13
Chaffee	16
Cheyenne	13
Clear Creek	17
Conejos	16
Costilla	16
Crowley	11
Custer	16
Delta	13
Denver	13
Dolores	15
Douglas	13
Eagle	15
El Paso	13
Elbert	13
Fremont	11
Garfield	15
Gilpin	13
Grand	17
Gunnison	17
Hinsdale	17
Huerfano	11
Jackson	17
Jefferson	13
Kiowa	13
Kit Carson	13
La Plata	15
Lake	17
Larimer	13
Las Animas	11
Lincoln	13
Logan	13
Mesa	13
Mineral	17
Moffat	15
Montezuma	15
Montrose	13
Morgan	13
Otero	11
Ouray	15
Park	17
Phillips	13
Pitkin	17
Prowers	11
Pueblo	11
Rio Blanco	15
Rio Grande	17
Routt	17
Saguache	16
San Juan	17
San Miguel	15
Sedgwick	13
Summit	17
Teller	13
Washington	13
Weld	13
Yuma	13

County	Zone
CONNECTICUT	
Fairfield	12
Hartford	13
Litchfield	14
Middlesex	12
New Haven	12
New London	12
Tolland	14
Windham	14
DELAWARE	
Kent	9
New Castle	10
Sussex	9
DC	
Washington	10
FLORIDA	
Alachua	3
Baker	3
Bay	4
Bradford	3
Brevard	2
Broward	1
Calhoun	4
Charlotte	2
Citrus	2
Clay	3
Collier	1
Columbia	3
Dade	1
De Soto	2
Dixie	3
Duval	3
Escambia	4
Flagler	3
Franklin	4
Gadsden	4
Gilchrist	3
Glades	1
Gulf	4
Hamilton	3
Hardee	2
Hendry	1
Hernando	2
Highlands	2
Hillsborough	2
Holmes	4
Indian River	2
Jackson	4
Jefferson	4
Lafayette	3
Lake	2
Lee	1
Leon	4
Levy	2
Liberty	4
Madison	3
Manatee	2
Marion	2
Martin	1
Monroe	1
Nassau	3
Okaloosa	4
Okeechobee	2
Orange	2
Osceola	2
Palm Beach	1
Pasco	2
Pinellas	2
Polk	2
Putnam	3
Santa Rosa	4
Sarasota	2
Seminole	2
St Johns	3
St Lucie	2
Sumter	2
Suwannee	3
Taylor	3
Union	3
Volusia	2
Wakulla	4
Walton	4
Washington	4
GEORGIA	
Appling	4
Atkinson	4
Bacon	4
Baker	4
Baldwin	6
Banks	7
Barrow	7
Bartow	7
Ben Hill	5
Berrien	4
Bibb	5
Bleckley	5
Brantley	4
Brooks	4
Bryan	4
Bulloch	5
Burke	6
Butts	7
Calhoun	5
Camden	4
Candler	5
Carroll	7
Catoosa	8
Charlton	4
Chatham	4
Chattahoochee	5
Chattooga	8
Cherokee	8
Clarke	7
Clay	5
Clayton	7
Clinch	4
Cobb	7
Coffee	5
Colquitt	4
Columbia	6
Cook	4
Coweta	7
Crawford	5
Crisp	5
Dade	8
Dawson	8
De Kalb	7
Decatur	4
Dodge	5
Dooly	5
Dougherty	5
Douglas	7
Early	5
Echols	4
Effingham	4
Elbert	7
Emanuel	5
Evans	4
Fannin	8
Fayette	7
Floyd	7
Forsyth	8
Franklin	7
Fulton	7
Gilmer	8
Glascock	6
Glynn	4
Gordon	8
Grady	4
Greene	6
Gwinnett	7
Habersham	8
Hall	7
Hancock	6
Haralson	7
Harris	6
Hart	7
Heard	6
Henry	7
Houston	5
Irwin	5
Jackson	7
Jasper	6
Jeff Davis	4
Jefferson	6
Jenkins	5
Johnson	5
Jones	6
Lamar	6
Lanier	4
Laurens	5
Lee	5
Liberty	4
Lincoln	6
Long	4
Lowndes	4
Lumpkin	8
Macon	5
Madison	7
Marion	5
Mcduffie	6
Mcintosh	4
Meriwether	6
Miller	4
Mitchell	4
Monroe	6
Montgomery	5
Morgan	6
Murray	8
Muscogee	5
Newton	7
Oconee	7
Oglethorpe	7
Paulding	7
Peach	5
Pickens	8
Pierce	4
Pike	6
Polk	7
Pulaski	5
Putnam	6
Quitman	5
Rabun	8
Randolph	5
Richmond	6
Rockdale	7
Schley	5
Screven	5
Seminole	4
Spalding	7
Stephens	7
Stewart	5
Sumter	5
Talbot	5
Taliaferro	6
Tattnall	4
Taylor	5
Telfair	5
Terrell	5
Thomas	4
Tift	5
Toombs	4
Towns	8
Treutlen	5
Troup	6
Turner	5
Twiggs	5
Union	8
Upson	5
Walker	8
Walton	7
Ware	4
Warren	6
Washington	6
Wayne	4
Webster	5
Wheeler	5
White	8
Whitfield	8
Wilcox	5
Wilkes	7
Wilkinson	5
Worth	5
HAWAII	
Hawaii	1
Honolulu	1
Kalawao	1
Kauai	1
Maui	1
IDAHO	
Ada	12
Adams	15
Bannock	15
Bear Lake	15
Benewah	14
Bingham	15
Blaine	15
Boise	15
Bonner	15
Bonneville	15
Boundary	15
Butte	16
Camas	15
Canyon	12
Caribou	15
Cassia	14
Clark	15
Clearwater	12
Custer	16
Elmore	13
Franklin	15
Fremont	16
Gem	13
Gooding	13
Idaho	15
Jefferson	16
Jerome	14
Kootenai	14
Latah	14
Lemhi	15
Lewis	15
Lincoln	15
Madison	16
Minidoka	15
Nez Perce	12
Oneida	15
Owyhee	12
Payette	12
Power	15
Shoshone	14
Teton	16
Twin Falls	14
Valley	16
Washington	13
ILLINOIS	
Adams	12
Alexander	10
Bond	11
Boone	14
Brown	12
Bureau	13
Calhoun	11
Carroll	14
Cass	12
Champaign	12
Christian	11
Clark	12
Clay	11
Clinton	10
Coles	12
Cook	14
Crawford	11
Cumberland	12
De Kalb	14
De Witt	12
Douglas	12
Du Page	14
Edgar	12
Edwards	11
Effingham	11
Fayette	11
Ford	13
Franklin	10
Fulton	13
Gallatin	10
Greene	11
Grundy	13
Hamilton	10
Hancock	13
Hardin	10
Henderson	13
Henry	13
Iroquois	13
Jackson	10
Jasper	11
Jefferson	11
Jersey	10
Jo Daviess	14
Johnson	10
Kane	14
Kankakee	13
Kendall	13
Knox	13
La Salle	13
Lake	14
Lawrence	11
Lee	14
Livingston	13
Logan	12
Macon	12
Macoupin	11
Madison	10
Marion	11
Marshall	13
Mason	12
Massac	10
Mcdonough	13

County	Zone	County	Zone	County	Zone	County	Zone	County	Zone
Mchenry	14	Hendricks	12	Buena Vista	15	Sioux	15	Lyon	11
Mclean	12	Henry	12	Butler	15	Story	14	Marion	11
Menard	12	Howard	13	Calhoun	15	Tama	14	Marshall	12
Mercer	13	Huntington	14	Carroll	14	Taylor	13	Mcpherson	11
Monroe	10	Jackson	11	Cass	14	Union	13	Meade	10
Montgomery	11	Jasper	13	Cedar	14	Van Buren	13	Miami	10
Morgan	12	Jay	13	Cerro Gordo	15	Wapello	13	Mitchell	12
Moultrie	12	Jefferson	10	Cherokee	15	Warren	14	Montgomery	9
Ogle	14	Jennings	11	Chickasaw	15	Washington	13	Morris	11
Peoria	13	Johnson	12	Clarke	13	Wayne	13	Morton	10
Perry	10	Knox	11	Clay	15	Webster	15	Nemaha	11
Piatt	12	Kosciusko	14	Clayton	15	Winnebago	15	Neosho	9
Pike	12	La Porte	13	Clinton	13	Winneshiek	15	Ness	12
Pope	10	Lagrange	14	Crawford	14	Woodbury	15	Norton	13
Pulaski	10	Lake	13	Dallas	14	Worth	15	Osage	10
Putnam	13	Lawrence	11	Davis	13	Wright	15	Osborne	12
Randolph	10	Madison	13	Decatur	13			Ottawa	11
Richland	11	Marion	12	Delaware	15	**KANSAS**		Pawnee	11
Rock Island	13	Marshall	13	Des Moines	13	Allen	10	Phillips	12
Saline	10	Martin	11	Dickinson	15	Anderson	10	Pottawatomie	11
Sangamon	12	Miami	14	Dubuque	14	Atchison	11	Pratt	10
Schuyler	12	Monroe	11	Emmet	15	Barber	9	Rawlins	13
Scott	12	Montgomery	12	Fayette	15	Barton	11	Reno	11
Shelby	11	Morgan	12	Floyd	15	Bourbon	10	Republic	12
St Clair	10	Newton	13	Franklin	15	Brown	11	Rice	11
Stark	13	Noble	14	Fremont	13	Butler	10	Riley	11
Stephenson	14	Ohio	11	Greene	14	Chase	10	Rooks	12
Tazewell	12	Orange	11	Grundy	15	Chautauqua	9	Rush	11
Union	10	Owen	12	Guthrie	14	Cherokee	9	Russell	11
Vermilion	12	Parke	12	Hamilton	15	Cheyenne	13	Saline	11
Wabash	11	Perry	10	Hancock	15	Clark	10	Scott	12
Warren	13	Pike	11	Hardin	15	Clay	11	Sedgwick	10
Washington	10	Porter	13	Harrison	14	Cloud	12	Seward	10
Wayne	11	Posey	10	Henry	13	Coffey	10	Shawnee	11
White	10	Pulaski	13	Howard	15	Comanche	9	Sheridan	12
Whiteside	14	Putnam	12	Humboldt	15	Cowley	9	Sherman	13
Will	13	Randolph	13	Ida	15	Crawford	9	Smith	12
Williamson	10	Ripley	11	Iowa	14	Decatur	13	Stafford	11
Winnebago	14	Rush	12	Jackson	14	Dickinson	11	Stanton	11
Woodford	13	Scott	11	Jasper	14	Doniphan	11	Stevens	10
		Shelby	12	Jefferson	13	Douglas	10	Sumner	9
INDIANA		Spencer	10	Johnson	13	Edwards	11	Thomas	13
Adams	13	St Joseph	13	Jones	14	Elk	9	Trego	12
Allen	13	Starke	13	Keokuk	13	Ellis	12	Wabaunsee	11
Bartholomew	11	Steuben	14	Kossuth	15	Ellsworth	11	Wallace	12
Benton	13	Sullivan	11	Lee	13	Finney	11	Washington	12
Blackford	13	Switzerland	10	Linn	14	Ford	11	Wichita	12
Boone	12	Tippecanoe	13	Louisa	13	Franklin	10	Wilson	9
Brown	11	Tipton	13	Lucas	13	Geary	11	Woodson	10
Carroll	13	Union	12	Lyon	15	Gove	12	Wyandotte	11
Cass	13	Vanderburgh	10	Madison	14	Graham	12		
Clark	10	Vermillion	12	Mahaska	13	Grant	11	**KENTUCKY**	
Clay	12	Vigo	12	Marion	13	Gray	11	Adair	9
Clinton	13	Wabash	14	Marshall	14	Greeley	12	Allen	9
Crawford	11	Warren	12	Mills	13	Greenwood	10	Anderson	10
Daviess	11	Warrick	10	Mitchell	15	Hamilton	11	Ballard	9
De Kalb	13	Washington	11	Monona	14	Harper	9	Barren	9
Dearborn	11	Wayne	12	Monroe	13	Harvey	11	Bath	11
Decatur	12	Wells	13	Montgomery	13	Haskell	11	Bell	10
Delaware	13	White	13	Muscatine	13	Hodgeman	11	Boone	11
Dubois	11	Whitley	14	Obrien	15	Jackson	11	Bourbon	10
Elkhart	13			Osceola	15	Jefferson	11	Boyd	11
Fayette	12	**IOWA**		Page	13	Jewell	12	Boyle	10
Floyd	10	Adair	14	Palo Alto	15	Johnson	11	Bracken	11
Fountain	12	Adams	13	Plymouth	15	Kearny	11	Breathitt	10
Franklin	12	Allamakee	15	Pocahontas	15	Kingman	10	Breckenridge	9
Fulton	14	Appanoose	13	Polk	14	Kiowa	10	Bullitt	10
Gibson	10	Audubon	14	Pottawattamie	14	Labette	9	Butler	9
Grant	13	Benton	14	Poweshiek	14	Lane	12	Caldwell	9
Greene	11	Black Hawk	15	Ringgold	13	Leavenworth	11	Calloway	9
Hamilton	12	Boone	14	Sac	15	Lincoln	11	Campbell	11
Hancock	12	Bremer	15	Scott	13	Linn	10	Carlisle	9
Harrison	10	Buchanan	15	Shelby	14	Logan	12	Carroll	10

County	Zone	County	Zone	County	Zone	County	Zone	County	Zone
Carter	11	Owsley	10	St Helena	4	Middlesex	13	Ontonagon	17
Casey	10	Pendleton	11	St James	3	Nantucket	12	Osceola	15
Christian	9	Perry	10	St John The Baptist	3	Norfolk	13	Oscoda	15
Clark	10	Pike	10	St Landry	4	Plymouth	12	Otsego	15
Clay	10	Powell	10	St Martin	4	Suffolk	13	Ottawa	14
Clinton	10	Pulaski	10	St Mary	3	Worcester	14	Presque Isle	15
Crittenden	9	Robertson	11	St Tammany	4			Roscommon	15
Cumberland	9	Rockcastle	10	Tangipahoa	4	**MICHIGAN**		Saginaw	14
Daviess	9	Rowan	11	Tensas	5	Alcona	15	Sanilac	14
Edmonson	9	Russell	10	Terrebonne	3	Alger	16	Schoolcraft	16
Elliot	11	Scott	11	Union	6	Allegan	14	Shiawassee	14
Estill	10	Shelby	10	Vermilion	4	Alpena	15	St Clair	14
Fayette	10	Simpson	9	Vernon	5	Antrim	15	St Joseph	14
Fleming	11	Spencer	10	Washington	4	Arenac	15	Tuscola	14
Floyd	10	Taylor	9	Webster	6	Baraga	17	Van Buren	14
Franklin	10	Todd	9	West Baton Rouge	4	Barry	14	Washtenaw	13
Fulton	9	Trigg	9	West Carroll	6	Bay	15	Wayne	13
Gallatin	11	Trimble	10	West Feliciana	4	Benzie	15	Wexford	15
Garrard	10	Union	9	Winn	5	Berrien	14		
Grant	11	Warren	9			Branch	14	**MINNESOTA**	
Graves	9	Washington	10	**MAINE**		Calhoun	14	Aitkin	17
Grayson	9	Wayne	10	Androscoggin	15	Cass	14	Anoka	16
Green	9	Webster	9	Aroostook	17	Charlevoix	15	Becker	17
Greenup	11	Whitley	10	Cumberland	15	Cheboygan	15	Beltrami	17
Hancock	9	Wolfe	10	Franklin	16	Chippewa	16	Benton	16
Hardin	9	Woodford	10	Hancock	15	Clare	15	Big Stone	16
Harlan	10			Kennebec	15	Clinton	14	Blue Earth	15
Harrison	11	**LOUISIANA**		Knox	15	Crawford	15	Brown	15
Hart	9	Acadia	4	Lincoln	15	Delta	16	Carlton	17
Henderson	9	Allen	4	Oxford	16	Dickinson	16	Carver	15
Henry	10	Ascension	4	Penobscot	15	Eaton	14	Cass	17
Hickman	9	Assumption	3	Piscataquis	17	Emmet	15	Chippewa	16
Hopkins	9	Avoyelles	5	Sagadahoc	15	Genesee	14	Chisago	16
Jackson	10	Beauregard	4	Somerset	17	Gladwin	15	Clay	17
Jefferson	10	Bienville	6	Waldo	15	Gogebic	17	Clearwater	17
Jessamine	10	Bossier	6	Washington	15	Grand Traverse	15	Cook	17
Johnson	11	Caddo	6	York	15	Gratiot	14	Cottonwood	15
Kenton	11	Calcasieu	4			Hillsdale	14	Crow Wing	17
Knott	10	Caldwell	6	**MARYLAND**		Houghton	17	Dakota	15
Knox	10	Cameron	4	Allegany	12	Huron	14	Dodge	15
Larue	9	Catahoula	5	Anne Arundel	9	Ingham	14	Douglas	16
Laurel	10	Claiborne	6	Baltimore	10	Ionia	14	Faribault	15
Lawrence	11	Concordia	5	Baltimore City	9	Iosco	15	Fillmore	15
Lee	10	De Soto	5	Calvert	9	Iron	17	Freeborn	15
Leslie	10	East Baton Rouge	4	Caroline	9	Isabella	15	Goodhue	15
Letcher	10	East Carroll	6	Carroll	11	Jackson	14	Grant	16
Lewis	11	East Feliciana	4	Cecil	10	Kalamazoo	14	Hennepin	15
Lincoln	10	Evangeline	4	Charles	9	Kalkaska	15	Houston	15
Livingston	9	Franklin	6	Dorchester	9	Kent	14	Hubbard	17
Logan	9	Grant	5	Frederick	11	Keweenaw	17	Isanti	16
Lyon	9	Iberia	4	Garrett	13	Lake	15	Itasca	17
Madison	10	Iberville	4	Harford	10	Lapeer	14	Jackson	15
Magoffin	10	Jackson	6	Howard	10	Leelanau	15	Kanabec	16
Marion	10	Jefferson	3	Kent	10	Lenawee	14	Kandiyohi	16
Marshall	9	Jefferson Davis	4	Montgomery	10	Livingston	14	Kittson	17
Martin	11	La Salle	5	Prince Georges	10	Luce	16	Koochiching	17
Mason	11	Lafayette	4	Queen Annes	9	Mackinac	16	Lac Qui Parle	15
Mccracken	9	Lafourche	3	Somerset	9	Macomb	14	Lake	17
Mccreary	10	Lincoln	6	St Marys	9	Manistee	15	Lake Of The Woods	17
Mclean	9	Livingston	4	Talbot	9	Marquette	16	Le Sueur	15
Meade	9	Madison	6	Washington	11	Mason	15	Lincoln	15
Menifee	10	Morehouse	6	Wicomico	9	Mecosta	15	Lyon	15
Mercer	10	Natchitoches	5	Worcester	9	Menominee	16	Mahnomen	17
Metcalfe	9	Orleans	3			Midland	15	Marshall	17
Monroe	9	Ouachita	6	**MASSACHUSETTS**		Missaukee	15	Martin	15
Montgomery	10	Plaquemines	3	Barnstable	12	Monroe	13	Mcleod	15
Morgan	10	Pointe Coupee	4	Berkshire	14	Montcalm	14	Meeker	16
Muhlenberg	9	Rapides	5	Bristol	12	Montmorency	15	Mille Lacs	16
Nelson	10	Red River	5	Dukes	12	Muskegon	14	Morrison	16
Nicholas	11	Richland	6	Essex	13	Newaygo	15	Mower	15
Ohio	9	Sabine	5	Franklin	14	Oakland	14	Murray	15
Oldham	10	St Bernard	3	Hampden	14	Oceana	15	Nicollet	15
Owen	10	St Charles	3	Hampshire	14	Ogemaw	15	Nobles	15

County	Zone	County	Zone	County	Zone	County	Zone	County	Zone
Norman	17	Lauderdale	6	Cooper	11	St Francois	10	Yellowstone	15
Olmsted	15	Lawrence	5	Crawford	10	St Louis	10	Yellowstone National Park	15
Otter Tail	17	Leake	6	Dade	10	St Louis City	10		
Pennington	17	Lee	7	Dallas	10	Ste Genevieve	10		
Pine	16	Leflore	6	Daviess	12	Stoddard	9	**NEBRASKA**	
Pipestone	15	Lincoln	5	De Kalb	12	Stone	9	Adams	13
Polk	17	Lowndes	6	Dent	10	Sullivan	12	Antelope	14
Pope	16	Madison	6	Douglas	10	Taney	9	Arthur	14
Ramsey	15	Marion	4	Dunklin	9	Texas	10	Banner	14
Red Lake	17	Marshall	7	Franklin	10	Vernon	11	Blaine	14
Redwood	15	Monroe	6	Gasconade	11	Warren	11	Boone	14
Renville	15	Montgomery	6	Gentry	13	Washington	10	Box Butte	15
Rice	15	Neshoba	6	Greene	10	Wayne	10	Boyd	14
Rock	15	Newton	6	Grundy	12	Webster	10	Brown	14
Roseau	17	Noxubee	6	Harrison	13	Worth	13	Buffalo	13
Scott	15	Oktibbeha	6	Henry	11	Wright	10	Burt	14
Sherburne	16	Panola	7	Hickory	11			Butler	13
Sibley	15	Pearl River	4	Holt	12	**MONTANA**		Cass	13
St Louis	17	Perry	5	Howard	11	Beaverhead	15	Cedar	14
Stearns	16	Pike	4	Howell	9	Big Horn	15	Chase	13
Steele	15	Pontotoc	7	Iron	10	Blaine	16	Cherry	14
Stevens	16	Prentiss	7	Jackson	11	Broadwater	15	Cheyenne	14
Swift	16	Quitman	7	Jasper	9	Carbon	15	Clay	13
Todd	16	Rankin	6	Jefferson	10	Carter	15	Colfax	13
Traverse	16	Scott	6	Johnson	11	Cascade	15	Cuming	14
Wabasha	15	Sharkey	6	Knox	12	Chouteau	15	Custer	14
Wadena	17	Simpson	5	Laclede	10	Custer	15	Dakota	14
Waseca	15	Smith	5	Lafayette	11	Daniels	16	Dawes	15
Washington	15	Stone	4	Lawrence	10	Dawson	15	Dawson	13
Watonwan	15	Sunflower	6	Lewis	12	Deer Lodge	16	Deuel	14
Wilkin	17	Tallahatchie	7	Lincoln	11	Fallon	15	Dixon	14
Winona	15	Tate	7	Linn	12	Fergus	15	Dodge	13
Wright	16	Tippah	7	Livingston	12	Flathead	16	Douglas	13
Yellow Medicine	15	Tishomingo	7	Macon	12	Gallatin	15	Dundy	13
		Tunica	7	Madison	10	Garfield	15	Fillmore	13
MISSISSIPPI		Union	7	Maries	11	Glacier	16	Franklin	13
Adams	5	Walthall	4	Marion	12	Golden Valley	15	Frontier	13
Alcorn	7	Warren	6	Mcdonald	9	Granite	16	Furnas	13
Amite	4	Washington	6	Mercer	13	Hill	16	Gage	13
Attala	6	Wayne	5	Miller	11	Jefferson	15	Garden	14
Benton	7	Webster	6	Mississippi	9	Judith Basin	15	Garfield	14
Bolivar	6	Wilkinson	4	Moniteau	11	Lake	15	Gosper	13
Calhoun	6	Winston	6	Monroe	12	Lewis And Clark	15	Grant	14
Carroll	6	Yalobusha	7	Montgomery	11	Liberty	16	Greeley	14
Chickasaw	6	Yazoo	6	Morgan	11	Lincoln	15	Hall	13
Choctaw	6			New Madrid	9	Madison	15	Hamilton	13
Claiborne	5	**MISSOURI**		Newton	9	Mccone	15	Harlan	13
Clarke	5	Adair	12	Nodaway	13	Meagher	15	Hayes	13
Clay	6	Andrew	12	Oregon	9	Mineral	15	Hitchcock	13
Coahoma	7	Atchison	13	Osage	11	Missoula	15	Holt	14
Copiah	5	Audrain	12	Ozark	9	Musselshell	15	Hooker	14
Covington	5	Barry	9	Pemiscot	9	Park	15	Howard	14
De Soto	7	Barton	10	Perry	10	Petroleum	15	Jefferson	13
Forrest	5	Bates	11	Pettis	11	Phillips	16	Johnson	13
Franklin	5	Benton	11	Phelps	10	Pondera	16	Kearney	13
George	4	Bollinger	10	Pike	12	Powder River	15	Keith	14
Greene	5	Boone	11	Platte	11	Powell	16	Keya Paha	14
Grenada	6	Buchanan	12	Polk	10	Prairie	15	Kimball	14
Hancock	4	Butler	9	Pulaski	10	Ravalli	15	Knox	14
Harrison	4	Caldwell	12	Putnam	13	Richland	15	Lancaster	13
Hinds	6	Callaway	11	Ralls	12	Roosevelt	16	Lincoln	14
Holmes	6	Camden	11	Randolph	12	Rosebud	15	Logan	14
Humphreys	6	Cape Girardeau	9	Ray	11	Sanders	15	Loup	14
Issaquena	6	Carroll	12	Reynolds	10	Sheridan	16	Madison	14
Itawamba	7	Carter	10	Ripley	9	Silver Bow	16	Mcpherson	14
Jackson	4	Cass	11	Saline	11	Stillwater	15	Merrick	13
Jasper	5	Cedar	11	Schuyler	13	Sweet Grass	15	Morrill	14
Jefferson	5	Chariton	12	Scotland	13	Teton	15	Nance	13
Jefferson Davis	5	Christian	10	Scott	9	Toole	16	Nemaha	13
Jones	5	Clark	13	Shannon	10	Treasure	15	Nuckolls	13
Kemper	6	Clay	11	Shelby	12	Valley	16	Otoe	13
Lafayette	7	Clinton	12	St Charles	10	Wheatland	15	Pawnee	13
Lamar	4	Cole	11	St Clair	11	Wibaux	15	Perkins	13

County	Zone
Phelps	13
Pierce	14
Platte	13
Polk	13
Red Willow	13
Richardson	13
Rock	14
Saline	13
Sarpy	13
Saunders	13
Scotts Bluff	14
Seward	13
Sheridan	15
Sherman	14
Sioux	15
Stanton	14
Thayer	13
Thomas	14
Thurston	14
Valley	14
Washington	13
Wayne	14
Webster	13
Wheeler	14
York	13
NEVADA	
Carson City	12
Churchill	12
Clark	5
Douglas	13
Elko	15
Esmeralda	12
Eureka	15
Humboldt	13
Lander	13
Lincoln	12
Lyon	13
Mineral	12
Nye	12
Pershing	12
Storey	12
Washoe	12
White Pine	15
NEW HAMPSHIRE	
Belknap	15
Carroll	15
Cheshire	15
Coos	16
Grafton	15
Hillsborough	15
Merrimack	15
Rockingham	15
Strafford	15
Sullivan	15
NEW JERSEY	
Atlantic	10
Bergen	12
Burlington	11
Camden	10
Cape May	10
Cumberland	10
Essex	11
Gloucester	10
Hudson	11
Hunterdon	12
Mercer	11
Middlesex	11
Monmouth	11
Morris	12
Ocean	11
Passaic	12
Salem	10
Somerset	12
Sussex	13
Union	11
Warren	12
NEW MEXICO	
Bernalillo	9
Catron	11
Chaves	7
Cibola	12
Colfax	13
Curry	9
De Baca	9
Dona Ana	7
Eddy	7
Grant	9
Guadalupe	9
Harding	11
Hidalgo	7
Lea	7
Lincoln	9
Los Alamos	13
Luna	7
Mckinley	13
Mora	15
Otero	7
Quay	8
Rio Arriba	12
Roosevelt	8
San Juan	12
San Miguel	12
Sandoval	13
Santa Fe	13
Sierra	8
Socorro	9
Taos	15
Torrance	11
Union	11
Valencia	10
NEW YORK	
Albany	14
Allegany	15
Bronx	11
Broome	15
Cattaraugus	15
Cayuga	14
Chautauqua	13
Chemung	15
Chenango	15
Clinton	15
Columbia	13
Cortland	15
Delaware	15
Dutchess	13
Erie	14
Essex	16
Franklin	16
Fulton	15
Genesee	14
Greene	14
Hamilton	16
Herkimer	15
Jefferson	15
Kings	10
Lewis	15
Livingston	14
Madison	14
Monroe	14
Montgomery	14
Nassau	11
New York	10
Niagara	14
Oneida	15
Onondaga	14
Ontario	14
Orange	12
Orleans	14
Oswego	14
Otsego	15
Putnam	12
Queens	10
Rensselaer	14
Richmond	11
Rockland	12
Saratoga	14
Schenectady	14
Schoharie	15
Schuyler	15
Seneca	14
St Lawrence	15
Steuben	15
Suffolk	11
Sullivan	15
Tioga	15
Tompkins	15
Ulster	15
Warren	15
Washington	15
Wayne	14
Westchester	12
Wyoming	14
Yates	14
NORTH CAROLINA	
Alamance	8
Alexander	8
Alleghany	11
Anson	7
Ashe	11
Avery	11
Beaufort	6
Bertie	7
Bladen	6
Brunswick	6
Buncombe	9
Burke	8
Cabarrus	7
Caldwell	8
Camden	7
Carteret	6
Caswell	8
Catawba	8
Chatham	8
Cherokee	9
Chowan	7
Clay	9
Cleveland	7
Columbus	6
Craven	6
Cumberland	7
Currituck	7
Dare	6
Davidson	8
Davie	8
Duplin	6
Durham	8
Edgecombe	7
Forsyth	8
Franklin	8
Gaston	7
Gates	7
Graham	9
Granville	8
Greene	7
Guilford	8
Halifax	7
Harnett	7
Haywood	9
Henderson	9
Hertford	7
Hoke	7
Hyde	6
Iredell	8
Jackson	9
Johnston	7
Jones	6
Lee	7
Lenoir	7
Lincoln	7
Macon	9
Madison	9
Martin	7
Mcdowell	8
Mecklenburg	7
Mitchell	11
Montgomery	7
Moore	7
Nash	7
New Hanover	6
Northampton	7
Onslow	6
Orange	8
Pamlico	6
Pasquotank	7
Pender	6
Perquimans	7
Person	8
Pitt	7
Polk	7
Randolph	8
Richmond	7
Robeson	7
Rockingham	8
Rowan	7
Rutherford	7
Sampson	6
Scotland	7
Stanly	7
Stokes	9
Surry	9
Swain	9
Transylvania	9
Tyrrell	6
Union	7
Vance	8
Wake	7
Warren	8
Washington	7
Watauga	11
Wayne	7
Wilkes	9
Wilson	7
Yadkin	8
Yancey	11
NORTH DAKOTA	
Adams	16
Barnes	17
Benson	17
Billings	16
Bottineau	17
Bowman	16
Burke	17
Burleigh	16
Cass	17
Cavalier	17
Dickey	16
Divide	17
Dunn	16
Eddy	17
Emmons	16
Foster	17
Golden Valley	16
Grand Forks	17
Grant	16
Griggs	17
Hettinger	16
Kidder	17
La Moure	16
Logan	16
Mchenry	17
Mcintosh	16
Mckenzie	16
Mclean	17
Mercer	16
Morton	16
Mountrail	17
Nelson	17
Oliver	16
Pembina	17
Pierce	17
Ramsey	17
Ransom	16
Renville	17
Richland	16
Rolette	17
Sargent	16
Sheridan	17
Sioux	16
Slope	16
Stark	16
Steele	17
Stutsman	17
Towner	17
Traill	17
Walsh	17
Ward	17
Wells	17
Williams	17
OHIO	
Adams	11
Allen	13
Ashland	13
Ashtabula	13
Athens	11
Auglaize	13
Belmont	12
Brown	11
Butler	12
Carroll	13
Champaign	13
Clark	13
Clermont	11
Clinton	12
Columbiana	13
Coshocton	12
Crawford	13
Cuyahoga	13
Darke	13
Defiance	14
Delaware	13
Erie	13
Fairfield	12
Fayette	12
Franklin	12
Fulton	14
Gallia	11
Geauga	13

County	Zone	County	Zone	County	Zone	County	Zone	County	Zone
Greene	12	Choctaw	6	Coos	9	Lycoming	13	Orangeburg	6
Guernsey	12	Cimarron	10	Crook	14	Mckean	15	Pickens	7
Hamilton	11	Cleveland	7	Curry	9	Mercer	14	Richland	6
Hancock	13	Coal	7	Deschutes	14	Mifflin	12	Saluda	6
Hardin	13	Comanche	7	Douglas	9	Monroe	13	Spartanburg	7
Harrison	13	Cotton	7	Gilliam	12	Montgomery	11	Sumter	6
Henry	14	Craig	9	Grant	15	Montour	13	Union	7
Highland	11	Creek	8	Harney	15	Northampton	12	Williamsburg	6
Hocking	12	Custer	8	Hood River	12	Northumberland	13	York	7
Holmes	13	Delaware	8	Jackson	11	Perry	12		
Huron	13	Dewey	9	Jefferson	13	Philadelphia	10	**SOUTH DAKOTA**	
Jackson	11	Ellis	9	Josephine	9	Pike	13	Aurora	15
Jefferson	13	Garfield	8	Klamath	14	Potter	15	Beadle	15
Knox	13	Garvin	7	Lake	15	Schuylkill	13	Bennett	14
Lake	13	Grady	7	Lane	10	Snyder	13	Bon Homme	14
Lawrence	11	Grant	9	Lincoln	11	Somerset	13	Brookings	16
Licking	12	Greer	7	Linn	10	Sullivan	14	Brown	16
Logan	13	Harmon	7	Malheur	12	Susquehanna	15	Brule	15
Lorain	13	Harper	9	Marion	10	Tioga	15	Buffalo	15
Lucas	14	Haskell	7	Morrow	12	Union	13	Butte	15
Madison	12	Hughes	7	Multnomah	10	Venango	14	Campbell	15
Mahoning	13	Jackson	7	Polk	10	Warren	14	Charles Mix	14
Marion	13	Jefferson	6	Sherman	13	Washington	12	Clark	16
Medina	13	Johnston	6	Tillamook	11	Wayne	15	Clay	14
Meigs	11	Kay	9	Umatilla	12	Westmoreland	13	Codington	16
Mercer	13	Kingfisher	8	Union	13	Wyoming	14	Corson	15
Miami	13	Kiowa	7	Wallowa	15	York	11	Custer	15
Monroe	12	Latimer	7	Wasco	13			Davison	15
Montgomery	12	Le Flore	7	Washington	10	**RHODE ISLAND**		Day	16
Morgan	12	Lincoln	7	Wheeler	13	Bristol	12	Deuel	16
Morrow	13	Logan	8	Yamhill	10	Kent	12	Dewey	15
Muskingum	12	Love	6			Newport	12	Douglas	14
Noble	12	Major	9	**PENNSYLVANIA**		Providence	14	Edmunds	15
Ottawa	13	Marshall	6	Adams	11	Washington	12	Fall River	15
Paulding	14	Mayes	8	Allegheny	12			Faulk	15
Perry	12	Mcclain	7	Armstrong	13	**SOUTH CAROLINA**		Grant	16
Pickaway	12	Mccurtain	7	Beaver	12	Abbeville	7	Gregory	14
Pike	11	Mcintosh	7	Bedford	13	Aiken	6	Haakon	15
Portage	13	Murray	7	Berks	12	Allendale	5	Hamlin	16
Preble	12	Muskogee	7	Blair	13	Anderson	7	Hand	15
Putnam	13	Noble	8	Bradford	15	Bamberg	5	Hanson	15
Richland	13	Nowata	9	Bucks	11	Barnwell	5	Harding	15
Ross	12	Okfuskee	7	Butler	14	Beaufort	5	Hughes	15
Sandusky	13	Oklahoma	8	Cambria	13	Berkeley	5	Hutchinson	14
Scioto	11	Okmulgee	8	Cameron	15	Calhoun	6	Hyde	15
Seneca	13	Osage	8	Carbon	13	Charleston	5	Jackson	14
Shelby	13	Ottawa	9	Centre	13	Cherokee	7	Jerauld	15
Stark	13	Pawnee	8	Chester	11	Chester	7	Jones	15
Summit	13	Payne	8	Clarion	14	Chesterfield	7	Kingsbury	15
Trumbull	13	Pittsburg	7	Clearfield	15	Clarendon	6	Lake	15
Tuscarawas	13	Pontotoc	7	Clinton	13	Colleton	5	Lawrence	15
Union	13	Pottawatomie	7	Columbia	13	Darlington	6	Lincoln	15
Van Wert	13	Pushmataha	6	Crawford	14	Dillon	6	Lyman	15
Vinton	11	Roger Mills	9	Cumberland	12	Dorchester	5	Marshall	16
Warren	12	Rogers	9	Dauphin	12	Edgefield	6	Mccook	15
Washington	11	Seminole	7	Delaware	10	Fairfield	7	Mcpherson	16
Wayne	13	Sequoyah	7	Elk	15	Florence	6	Meade	15
Williams	14	Stephens	7	Erie	14	Georgetown	5	Mellette	14
Wood	14	Texas	10	Fayette	12	Greenville	7	Miner	15
Wyandot	13	Tillman	7	Forest	15	Greenwood	7	Minnehaha	15
		Tulsa	8	Franklin	11	Hampton	5	Moody	15
OKLAHOMA		Wagoner	8	Fulton	12	Horry	5	Pennington	15
Adair	8	Washington	9	Greene	12	Jasper	5	Perkins	15
Alfalfa	9	Washita	8	Huntingdon	12	Kershaw	7	Potter	15
Atoka	7	Woods	9	Indiana	13	Lancaster	7	Roberts	16
Beaver	10	Woodward	9	Jefferson	15	Laurens	7	Sanborn	15
Beckham	8			Juniata	12	Lee	6	Shannon	15
Blaine	8	**OREGON**		Lackawanna	14	Lexington	6	Spink	15
Bryan	7	Baker	15	Lancaster	11	Marion	6	Stanley	15
Caddo	8	Benton	10	Lawrence	14	Marlboro	6	Sully	15
Canadian	8	Clackamas	10	Lebanon	12	Mccormick	6	Todd	14
Carter	6	Clatsop	11	Lehigh	12	Newberry	6	Tripp	14
Cherokee	8	Columbia	11	Luzerne	13	Oconee	7	Turner	15

County	Zone	County	Zone	County	Zone	County	Zone	County	Zone
Union	14	Perry	8	Collingsworth	7	Hutchinson	9	Rains	6
Walworth	15	Pickett	10	Colorado	4	Irion	5	Randall	9
Yankton	14	Polk	8	Comal	4	Jack	6	Reagan	5
Ziebach	15	Putnam	9	Comanche	5	Jackson	3	Real	4
		Rhea	8	Concho	5	Jasper	4	Red River	6
TENNESSEE		Roane	9	Cooke	6	Jeff Davis	6	Reeves	6
Anderson	9	Robertson	9	Coryell	5	Jefferson	4	Refugio	3
Bedford	8	Rutherford	8	Cottle	7	Jim Hogg	3	Roberts	9
Benton	9	Scott	10	Crane	5	Jim Wells	3	Robertson	4
Bledsoe	8	Sequatchie	8	Crockett	5	Johnson	5	Rockwall	5
Blount	8	Sevier	9	Crosby	7	Jones	6	Runnels	5
Bradley	8	Shelby	7	Culberson	6	Karnes	3	Rusk	5
Campbell	10	Smith	9	Dallam	9	Kaufman	5	Sabine	5
Cannon	9	Stewart	9	Dallas	5	Kendall	5	San Augustine	5
Carroll	9	Sullivan	9	Dawson	7	Kenedy	2	San Jacinto	4
Carter	10	Sumner	9	De Witt	3	Kent	7	San Patricio	3
Cheatham	9	Tipton	8	Deaf Smith	9	Kerr	5	San Saba	5
Chester	8	Trousdale	9	Delta	6	Kimble	5	Schleicher	5
Claiborne	10	Unicoi	10	Denton	5	King	7	Scurry	7
Clay	9	Union	9	Dickens	7	Kinney	4	Shackelford	6
Cocke	9	Van Buren	9	Dimmit	3	Kleberg	2	Shelby	5
Coffee	8	Warren	9	Donley	8	Knox	7	Sherman	9
Crockett	8	Washington	9	Duval	3	La Salle	3	Smith	5
Cumberland	9	Wayne	8	Eastland	6	Lamar	6	Somervell	5
Davidson	8	Weakley	9	Ector	6	Lamb	8	Starr	2
De Kalb	9	White	9	Edwards	4	Lampasas	5	Stephens	6
Decatur	8	Williamson	8	El Paso	6	Lavaca	4	Sterling	6
Dickson	9	Wilson	9	Ellis	5	Lee	4	Stonewall	7
Dyer	8			Erath	5	Leon	5	Sutton	5
Fayette	7	**TEXAS**		Falls	5	Liberty	4	Swisher	9
Fentress	10	Anderson	5	Fannin	6	Limestone	5	Tarrant	5
Franklin	8	Andrews	6	Fayette	4	Lipscomb	9	Taylor	6
Gibson	9	Angelina	4	Fisher	6	Live Oak	3	Terrell	5
Giles	8	Aransas	3	Floyd	8	Llano	5	Terry	7
Grainger	9	Archer	6	Foard	7	Loving	6	Throckmorton	6
Greene	9	Armstrong	9	Fort Bend	4	Lubbock	7	Titus	6
Grundy	9	Atascosa	3	Franklin	6	Lynn	7	Tom Green	5
Hamblen	9	Austin	4	Freestone	5	Madison	4	Travis	4
Hamilton	8	Bailey	9	Frio	3	Marion	6	Trinity	4
Hancock	10	Bandera	4	Gaines	7	Martin	6	Tyler	4
Hardeman	8	Bastrop	4	Galveston	3	Mason	5	Upshur	6
Hardin	8	Baylor	7	Garza	7	Matagorda	3	Upton	5
Hawkins	9	Bee	3	Gillespie	5	Maverick	3	Uvalde	4
Haywood	8	Bell	5	Glasscock	6	Mcculloch	5	Val Verde	4
Henderson	8	Bexar	4	Goliad	3	Mclennan	5	Van Zandt	5
Henry	9	Blanco	5	Gonzales	4	Mcmullen	3	Victoria	3
Hickman	9	Borden	7	Gray	9	Medina	4	Walker	4
Houston	9	Bosque	5	Grayson	6	Menard	5	Waller	4
Humphreys	9	Bowie	6	Gregg	6	Midland	6	Ward	6
Jackson	9	Brazoria	3	Grimes	4	Milam	4	Washington	4
Jefferson	9	Brazos	4	Guadalupe	4	Mills	5	Webb	3
Johnson	10	Brewster	5	Hale	8	Mitchell	6	Wharton	3
Knox	8	Briscoe	8	Hall	8	Montague	6	Wheeler	8
Lake	9	Brooks	3	Hamilton	5	Montgomery	4	Wichita	7
Lauderdale	8	Brown	5	Hansford	9	Moore	9	Wilbarger	7
Lawrence	8	Burleson	4	Hardeman	7	Morris	6	Willacy	2
Lewis	8	Burnet	5	Hardin	4	Motley	7	Williamson	4
Lincoln	8	Caldwell	4	Harris	4	Nacogdoches	5	Wilson	4
Loudon	8	Calhoun	3	Harrison	6	Navarro	5	Winkler	6
Macon	9	Callahan	6	Hartley	9	Newton	4	Wise	5
Madison	8	Cameron	2	Haskell	6	Nolan	6	Wood	6
Marion	8	Camp	6	Hays	4	Nueces	3	Yoakum	8
Marshall	8	Carson	9	Hemphill	8	Ochiltree	9	Young	6
Maury	9	Cass	6	Henderson	5	Oldham	9	Zapata	2
Mcminn	8	Castro	9	Hidalgo	2	Orange	4	Zavala	3
Mcnairy	8	Chambers	4	Hill	5	Palo Pinto	6		
Meigs	8	Cherokee	5	Hockley	8	Panola	5	**UTAH**	
Monroe	8	Childress	7	Hood	5	Parker	5	Beaver	14
Montgomery	9	Clay	6	Hopkins	6	Parmer	9	Box Elder	12
Moore	8	Cochran	8	Houston	5	Pecos	5	Cache	15
Morgan	10	Coke	6	Howard	6	Polk	4	Carbon	14
Obion	9	Coleman	5	Hudspeth	6	Potter	9	Daggett	15
Overton	9	Collin	5	Hunt	6	Presidio	5	Davis	12

County	Zone
Duchesne	15
Emery	14
Garfield	14
Grand	10
Iron	12
Juab	12
Kane	10
Millard	13
Morgan	15
Piute	13
Rich	15
Salt Lake	12
San Juan	13
Sanpete	14
Sevier	13
Summit	15
Tooele	12
Uintah	15
Utah	12
Wasatch	15
Washington	10
Wayne	14
Weber	12
VERMONT	
Addison	15
Bennington	15
Caledonia	16
Chittenden	15
Essex	16
Franklin	15
Grand Isle	15
Lamoille	16
Orange	16
Orleans	16
Rutland	15
Washington	16
Windham	15
Windsor	15
VIRGINIA	
Accomack	8
Albemarle	9
Alleghany	10
Amelia	9
Amherst	9
Appomattox	9
Arlington	10
Augusta	11
Bath	11
Bedford	9
Bland	11
Botetourt	9
Brunswick	8
Buchanan	10
Buckingham	9
Campbell	9
Caroline	9
Carroll	11
Charles City	8
Charlotte	9
Chesterfield	9
Clarke	11
Craig	10
Culpeper	10
Cumberland	9
Dickenson	10
Dinwiddie	8
Essex	9
Fairfax	10
Fauquier	10
Floyd	11
Fluvanna	9
Franklin	10
Frederick	11
Fredericksburg Giles	10
Gloucester	8
Goochland	9
Grayson	11
Greene	10
Greensville	8
Halifax	9
Hampton	8
Hanover	9
Henrico	8
Henry	10
Highland	11
Isle Of Wight	8
James City	8
King And Queen	9
King George	9
King William	9
Lancaster	8
Lee	10
Loudoun	10
Louisa	9
Lunenburg	9
Madison	11
Mathews	8
Mecklenburg	9
Middlesex	8
Montgomery	11
Nansemond	8
Nelson	9
New Kent	8
Newport News	8
Norfolk	8
Northampton	8
Northumberland	8
Nottoway	9
Orange	10
Page	11
Patrick	10
Pittsylvania	9
Powhatan	9
Prince Edward	9
Prince George	8
Prince William	10
Pulaski	11
Rappahannock	11
Richmond	8
Roanoke	9
Rockbridge	9
Rockingham	11
Russell	10
Scott	10
Shenandoah	11
Smyth	11
Southampton	8
Spotsylvania	10
Stafford	10
Surry	8
Sussex	8
Tazewell	11
Virginia Beach	8
Warren	11
Washington	11
Westmoreland	8
Wise	10
Wythe	11
York	8
VIRGINIA INDEPENDENT CITIES	
Alexandria	10
Bedford	9
Bristol	11
Buena Vista	9
Charlottesville	9
Chesapeake	8
Clifton Forge	10
Colonial Hts	9
Covington	10
Danville	9
Emporia	8
Fairfax	10
Falls Church	10
Franklin	8
Fredericksburg	10
Galax	11
Hampton	8
Harrisonburg	11
Hopewell	8
Lexington	9
Lynchburg	9
Manassas	10
Manassas Park	10
Martinsville	10
Newport News	8
Norfolk	8
Norton	10
Petersburg	8
Poquoson	8
Portsmouth	8
Radford	11
Richmond	8
Roanoke	9
Salem	9
South Boston	9
Staunton	11
Suffolk	8
Virginia Beach	8
Waynesboro	11
Williamsburg	8
Winchester	11
WASHINGTON	
Adams	12
Asotin	12
Benton	11
Chelan	12
Clallam	12
Clark	11
Columbia	12
Cowlitz	11
Douglas	14
Ferry	15
Franklin	11
Garfield	12
Grant	12
Grays Harbor	11
Island	12
Jefferson	11
King	10
Kitsap	11
Kittitas	14
Klickitat	12
Lewis	11
Lincoln	15
Mason	11
Okanogan	15
Pacific	11
Pend Oreille	15
Pierce	11
San Juan	12
Skagit	11
Skamania	11
Snohomish	11
Spokane	14
Stevens	15
Thurston	11
Wahkiakum	11
Walla Walla	11
Whatcom	12
Whitman	14
Yakima	12
WEST VIRGINIA	
Barbour	13
Berkeley	11
Boone	10
Braxton	11
Brooke	12
Cabell	10
Calhoun	11
Clay	11
Doddridge	12
Fayette	12
Gilmer	11
Grant	13
Greenbrier	12
Hampshire	11
Hancock	12
Hardy	12
Harrison	12
Jackson	11
Jefferson	11
Kanawha	10
Lewis	12
Lincoln	10
Logan	10
Marion	12
Marshall	12
Mason	11
Mcdowell	11
Mercer	11
Mineral	12
Mingo	10
Monongalia	12
Monroe	11
Morgan	11
Nicholas	12
Ohio	12
Pendleton	13
Pleasants	11
Pocahontas	13
Preston	13
Putnam	10
Raleigh	12
Randolph	13
Ritchie	11
Roane	11
Summers	12
Taylor	12
Tucker	13
Tyler	11
Upshur	12
Wayne	10
Webster	12
Wetzel	12
Wirt	11
Wood	11
Wyoming	11
WISCONSIN	
Adams	15
Ashland	17
Barron	16
Bayfield	17
Brown	15
Buffalo	15
Burnett	17
Calumet	15
Chippewa	15
Clark	15
Columbia	15
Crawford	15
Dane	15
Dodge	15
Door	15
Douglas	17
Dunn	15
Eau Claire	15
Florence	17
Fond Du Lac	15
Forest	17
Grant	15
Green	15
Green Lake	15
Iowa	15
Iron	17
Jackson	15
Jefferson	15
Juneau	15
Kenosha	15
Kewaunee	15
La Crosse	15
Lafayette	15
Langlade	17
Lincoln	17
Manitowoc	15
Marathon	15
Marinette	15
Marquette	15
Menominee	15
Milwaukee	15
Monroe	15
Oconto	15
Oneida	17
Outagamie	15
Ozaukee	15
Pepin	15
Pierce	15
Polk	16
Portage	15
Price	17
Racine	15
Richland	15
Rock	15
Rusk	16
Sauk	15
Sawyer	17
Shawano	15
Sheboygan	15
St Croix	15
Taylor	17
Trempealeau	15
Vernon	15
Vilas	17
Walworth	15
Washburn	17
Washington	15
Waukesha	15
Waupaca	15
Waushara	15
Winnebago	15
Wood	15
WYOMING	
Albany	16
Big Horn	15
Campbell	15
Carbon	16
Converse	15
Crook	15

County	Zone	County	Zone	County	Zone	County	Zone	County	Zone
Fremont	15								
Goshen	14								
Hot Springs	15								
Johnson	15								
Laramie	15								
Lincoln	17								
Natrona	15								
Niobrara	15								
Park	15								
Platte	14								

1993 Model Energy Code

Summary of Basic Requirements

MECcheck

Air Leakage	Joints, penetrations, and all other such openings in the building envelope that are sources of air leakage must be caulked, gasketed, weatherstripped, or otherwise sealed. The maximum leakage rates for manufactured windows and doors are shown on the reverse side.
Vapor Retarder	Vapor retarders must be installed on the warm-in-winter side of all non-vented framed ceilings, walls, and floors. This requirement does not apply to the following locations nor where moisture or its freezing will not damage the materials. • Texas — Zones 2-5 • Alabama, Georgia, N. Carolina, Oklahoma, S. Carolina — Zones 4-6 • Arkansas, Tennessee — Zones 6-7 • Florida, Hawaii, Louisiana, Mississippi — All Zones
Materials and Insulation Information	Materials and equipment must be identified so that compliance can be determined. Manufacturer manuals for all installed heating and cooling equipment and service water heating equipment must be provided. Insulation R-values, glazing and door U-values, and heating and cooling equipment efficiency (if high-efficiency credit is taken) must be clearly marked on the building plans or specifications.
Duct Insulation	Supply and return ducts for heating and cooling systems located in unconditioned spaces must be insulated to the levels shown on the reverse side of this sheet. Exceptions: Insulation is not required for exhaust air ducts, ducts within HVAC equipment, and when the design temperature difference between the air in the duct and the surrounding air is 15°F or less.
Duct Construction	All transverse joints must be sealed with mastic, tape, or mastic plus tape. The HVAC system must provide a means for balancing air and water systems.
Temperature Controls	Thermostats are required for each separate HVAC system in single-family buildings and each dwelling unit in multifamily buildings (non-dwelling portions of multifamily buildings must have one thermostat for each system or zone). Thermostats must have the following ranges: Heating Only 55°F - 75°F Cooling Only 70°F - 85°F Heating and Cooling 55°F - 85°F A manual or automatic means to partially restrict or shut off the heating and/or cooling input to each zone or floor shall be provided for single-family homes and to each room for multifamily buildings.
HVAC Piping Insulation	HVAC piping in unconditioned spaces conveying fluids at temperatures above 120°F or chilled fluids at less than 55°F must be insulated to the levels shown on the reverse side of this sheet.
Swimming Pools	All heated swimming pools must have an on/off pool heater switch. Heated pools require a pool cover unless over 20% of the heating energy is from non-depletable sources. All swimming pool pumps must be equipped with a time clock.
Circulating Hot Water	Circulating hot water systems must have automatic or manual controls and pipes must be insulated to the levels shown on the reverse side of this sheet.
Electric Systems	Each multifamily dwelling unit must be equipped with separate electric meters.

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Duct Insulation R-Value Requirements

Zone Number	Ducts in Unconditioned Spaces (i.e. Attics, Crawl Spaces, Unheated Basements and Garages, and Exterior Cavities)	Ducts Outside the Building
Zones 1-4	R-5	R-8
Zones 5-14	R-5	R-6.5
Zone 15-19	R-5	R-8

Maximum Leakage Rates for Manufactured Windows and Doors

Frame Type	Windows (cfm/ft of Operable Sash Crack)	Doors (cfm per ft^2 of Door Area)	
		Sliders	Swinging
Wood	0.34	0.35	0.5
Aluminum	0.37	0.37	0.5
PVC	0.37	0.37	0.5

Minimum Insulation Thickness for HVAC Pipes[a]

Piping System Types	Fluid Temp Range (°F)	Insulation Thickness in Inches by Pipe Sizes[b]			
		Runouts 2 in.[c]	1 in. and Less	1.25 in. to 2 in.	2.5 in. to 4 in.
Heating Systems					
Low Pressure/Temperature	201-250	1.0	1.5	1.5	2.0
Low Temperature	120-200	0.5	1.0	1.0	1.5
Steam Condensate (for feed water)	Any	1.0	1.0	1.5	2.0
Cooling Systems					
Chilled Water	40-55	1.5	1.5	0.75	1.0

(a) The pipe insulation thicknesses specified in this table are based on insulation R-values ranging from R-4 to R-4.6 per inch of thickness. For materials with an R-value greater than R-4.6, the insulation thickness specified in this table may be reduced as follows:

$$New\ Minimum\ Thickness = \frac{4.6\ x\ Table\ 2\text{-}2\ Thickness}{Actual\ R\text{-}Value}$$

For materials with an R-value less than R-4, the minimum insulation thickness must be increased as follows:

$$New\ Minimum\ Thickness = \frac{4.0\ x\ Table\ 2\text{-}2\ Thickness}{Actual\ R\text{-}Value}$$

(b) For piping exposed to outdoor air, increase thickness by 0.5 in.
(c) Applies to runouts not exceeding 12 ft in length to individual terminal units.

Minimum Insulation Thickness for Circulating Hot Water Pipes

Heated Water Temperature (°F)	Insulation Thickness in Inches by Pipe Sizes[a]			
	Non-Circulating Runouts	Circulating Mains and Runouts		
	Up to 1 in.	Up to 1.25 in.	1.5 - 2.0 in.	Over 2 in.
170-180	0.5	1.0	1.5	2.0
140-160	0.5	0.5	1.0	1.5
100-130	0.5	0.5	0.5	1.0

(a) Nominal pipe size and insulation thickness.

Prescriptive Package Worksheet

Builder Name _____ Date _____

Builder Address _____

Building Address _____

Zone Number _____ Package Number _____

Submitted By _____ Phone Number _____

Enforcement Agency:
_____ Permit #
_____ Checked By
_____ Date

PROPOSED

REQUIRED

Glazing Area

100 X _____ (Glazing Area) ÷ _____ (Gross Wall Area) = _____ (Proposed Glazing Area) %

_____ % Maximum Glazing Area

R-Value

Description	Comments	Proposed R-Value	Minimum R-Value
Ceiling		R-	R-
Wall		R-	R-
Floor Over Unconditioned Space		R-	R-
Floor Over Outside Air		R-	R-
Basement Wall		R-	R-
Slab Floor		R-	R-
Crawl Space Wall		R-	R-

U-Value

Description	Comments	Proposed U-Value	Maximum U-Value
Glazing		U-	U-
Opaque Door		U-	U- 0.35

Equipment Efficiency (This section may be left blank if *Normal* is selected on the right.)

Heating _____ AFUE/HSPF _____

Cooling _____ SEER _____

Efficiency Make & Model Number

Check One

- o Normal
- o High Heating
- o High Cooling
- o High Heating & Cooling

Statement of Compliance: The proposed building design represented in these documents is consistent with the building plans, specifications, and other calculations submitted with the permit application. The proposed building has been designed to meet the requirements of the 1993 CABO Model Energy Code.

_____ Builder/Designer _____ Company Name _____ Date

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R-Value/U-Value
Weighted Average Worksheet

(optional)

Assembly:

Component Description	R-Value	U-Value (1 ÷ R-Value)	Area	U-Value x Area (UA)
			Total Area =	Total UA =

_____ ÷ _____ = _____
Total Area / Total UA / Weighted Average R-Value

_____ ÷ _____ = _____
Total UA / Total Area / Weighted Average U-Value

Assembly:

Component Description	R-Value	U-Value (1 ÷ R-Value)	Area	U-Value x Area (UA)
			Total Area =	Total UA =

_____ ÷ _____ = _____
Total Area / Total UA / Weighted Average R-Value

_____ ÷ _____ = _____
Total UA / Total Area / Weighted Average U-Value

Glazing Area/U-Value Trade-Off Worksheet

(optional)

The glazing area and U-value requirements for any prescriptive package can be altered to better meet your building design. Any combination of area and U-value that satisfies the following relationship can be used:

New Area x New U-Value ≤ *Package Area x Package U-Value*

Where *Package Area* and *Package U-Value* are the area and U-value in the prescriptive package you have selected and *New Area* and *New U-Value* are your altered window and U-value combination.

Fill in the following blanks and attach this worksheet to the *Prescriptive Package Worksheet*. See the back side of this worksheet for examples.

Zone Number _____ Package Number _____

Package Glazing Requirements:

_____ (Glazing Area %) x _____ (Glazing U-Value) = _____ (Package Glazing Total)

New Glazing Requirements:

_____ (Glazing Area %) x _____ (Glazing U-Value) = _____ (New Glazing Total)

New Glazing Total must be less than or equal to *Package Glazing Total*.

Example 1:

Refer to the single family prescriptive packages for Zone 8. Package 3 lists a maximum window area percentage of 15% and a maximum U-value of 0.65. The *Package Window Total* (area x U-value) for this package is 9.8. Assume, however, that your building design calls for a window area of 17%. To determine the maximum allowable U-value for a 17% window area, divide the *Package Window Total* by 17%:

New Window U-Value = (15 x 0.65) ÷ 17 = 0.57

The new window requirements are a window area percentage of 17% and a U-value of 0.57.

Zone Number 8 Package Number 5

Package Glazing Requirements:

Glazing Area %	x	Glazing U-Value	=	Package Glazing Total
15		0.65		9.8

New Glazing Requirements:

Glazing Area %	x	Glazing U-Value	=	New Glazing Total
17		0.57		9.7

New Glazing Total must be less than or equal to *Package Glazing Total.*

Example 2:

The *Window Area/U-Value Trade-Off Worksheet* is also useful if you prefer to install windows with a U-value that is different from the package requirement. As in the previous example, assume that you have selected Package 3 from Zone 8, but prefer to use windows with a U-value of 0.72. To determine the maximum allowable area for windows with a U-value of 0.72, divide the *Package Window Total* by 0.72:

New Window Area = (15 x 0.65) ÷ 0.72 = 13.5

The new window requirements are a window area percentage of 13.5% and a U-value of 0.72.

Zone Number 8 Package Number 5

Package Glazing Requirements:

Glazing Area %	x	Glazing U-Value	=	Package Glazing Total
15		0.65		9.8

New Glazing Requirements:

Glazing Area %	x	Glazing U-Value	=	New Glazing Total
13.5		0.72		9.7

New Glazing Total must be less than or equal to *Package Glazing Total.*

Prescriptive Packages - Zone 1

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Package	MAXIMUM		MINIMUM					Heating/Cooling Equipment Efficiency[9]
	Glazing Area Percent[1]	Glazing U-Value[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	12%	Any	R-13	R-11	R-11	R-0	R-0	Normal
2	15%	Any	R-19	R-11	R-11	R-0	R-5	Normal
3	15%	0.90	R-13	R-11	R-11	R-0	R-0	Normal
4	18%	0.90	R-19	R-11	R-11	R-0	R-5	Normal
5	18%	0.75	R-13	R-11	R-11	R-0	R-0	Normal
6	25%	0.75	R-30	R-13	R-11	R-0	R-5	Normal
7	25%	0.60	R-13	R-11	R-11	R-0	R-0	Normal
8	12%	Any	R-13	R-11	R-0	R-0	R-0	High Cooling
9	15%	Any	R-13	R-11	R-11	R-0	R-0	High Cooling
10	18%	Any	R-13	R-11	R-11	R-0	R-0	High Cooling
11	25%	Any	R-13	R-11	R-11	R-0	R-0	High Cooling

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Prescriptive Packages - Zone 2

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Package	MAXIMUM		MINIMUM					Heating/Cooling Equipment Efficiency[9]
	Glazing Area Percent[1]	Glazing U-Value[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	12%	Any	R-13	R-11	R-11	R-0	R-4	Normal
2	15%	Any	R-19	R-13	R-11	R-0	R-5	Normal
3	18%	0.90	R-19	R-13	R-11	R-0	R-5	Normal
4	25%	0.70	R-30	R-11	R-11	R-0	R-5	Normal
5	25%	0.65	R-19	R-11	R-11	R-0	R-5	Normal
6	12%	0.65	R-13	R-13	R-0	R-0	R-0	High Cooling
7	15%	Any	R-13	R-11	R-11	R-0	R-2	High Cooling
8	15%	0.50	R-13	R-11	R-0	R-0	R-0	High Cooling
9	18%	Any	R-13	R-11	R-11	R-0	R-3	High Cooling
10	25%	0.90	R-13	R-13	R-11	R-0	R-6	High Cooling
11	15%	0.75	R-13	R-11	R-0	R-0	R-0	High Heat/Cool
12	18%	0.75	R-13	R-13	R-0	R-0	R-0	High Heat/Cool
13	25%	Any	R-13	R-11	R-11	R-0	R-5	High Heat/Cool

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Prescriptive Packages - Zone 3

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Package	MAXIMUM		MINIMUM					Heating/Cooling Equipment Efficiency[9]
	Glazing Area Percent[1]	Glazing U-Value[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	12%	Any	R-30	R-11	R-11	R-0	R-5	Normal
2	12%	0.75	R-13	R-11	R-11	R-0	R-4	Normal
3	15%	0.90	R-30	R-11	R-11	R-0	R-5	Normal
4	15%	0.75	R-13	R-13	R-11	R-0	R-5	Normal
5	18%	0.75	R-26	R-11	R-11	R-0	R-5	Normal
6	18%	0.70	R-19	R-11	R-13	R-0	R-5	Normal
7	25%	0.60	R-38	R-13	R-11	R-0	R-5	Normal
8	25%	0.55	R-26	R-11	R-11	R-0	R-5	Normal
9	12%	Any	R-13	R-11	R-11	R-0	R-4	High Cooling
10	15%	0.90	R-13	R-11	R-11	R-0	R-4	High Cooling
11	18%	0.90	R-19	R-13	R-11	R-0	R-5	High Cooling
12	25%	0.75	R-38	R-11	R-13	R-0	R-6	High Cooling
13	25%	0.70	R-26	R-11	R-11	R-0	R-5	High Cooling
14	15%	Any	R-13	R-11	R-11	R-0	R-3	High Heat/Cool
15	18%	Any	R-13	R-11	R-11	R-0	R-5	High Heat/Cool
16	25%	0.90	R-30	R-11	R-11	R-0	R-5	High Heat/Cool
17	25%	0.75	R-13	R-11	R-11	R-0	R-4	High Heat/Cool

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Prescriptive Packages - Zone 4

1993 Model Energy Code for Single-Family Buildings

MECcheck

Package	MAXIMUM		MINIMUM						Heating/Cooling Equipment Efficiency[9]
	Glazing Area Percent[1]	Glazing U-Value[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Basement Wall R-Value[6]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	12%	0.90	R-19	R-13	R-11	R-5	R-0	R-5	Normal
2	15%	0.75	R-26	R-11	R-11	R-5	R-0	R-5	Normal
3	15%	0.70	R-19	R-11	R-13	R-5	R-0	R-5	Normal
4	18%	0.70	R-30	R-14	R-11	R-5	R-0	R-5	Normal
5	18%	0.60	R-19	R-13	R-11	R-5	R-0	R-5	Normal
6	25%	0.60	R-38	R-13	R-19	R-7	R-2	R-8	Normal
7	25%	0.50	R-26	R-13	R-11	R-5	R-0	R-5	Normal
8	12%	Any	R-13	R-11	R-13	R-5	R-0	R-6	High Heating
9	15%	0.90	R-13	R-13	R-11	R-5	R-0	R-5	High Heating
10	18%	0.90	R-26	R-13	R-11	R-5	R-0	R-5	High Heating
11	25%	0.70	R-30	R-13	R-13	R-5	R-0	R-6	High Heating
12	12%	Any	R-19	R-13	R-11	R-5	R-0	R-5	High Cooling
13	15%	0.90	R-30	R-11	R-11	R-5	R-0	R-5	High Cooling
14	15%	0.75	R-13	R-13	R-11	R-5	R-0	R-5	High Cooling
15	18%	0.75	R-19	R-13	R-13	R-5	R-0	R-6	High Cooling
16	25%	0.60	R-30	R-13	R-11	R-5	R-0	R-5	High Cooling
17	12%	Any	R-13	R-11	R-11	R-3	R-0	R-3	High Heat/Cool
18	15%	Any	R-13	R-11	R-13	R-5	R-0	R-6	High Heat/Cool
19	15%	0.90	R-13	R-11	R-11	R-3	R-0	R-3	High Heat/Cool
20	18%	0.90	R-13	R-13	R-11	R-4	R-0	R-5	High Heat/Cool
21	25%	0.75	R-19	R-13	R-13	R-5	R-0	R-6	High Heat/Cool

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Prescriptive Packages - Zone 5

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Package	MAXIMUM		MINIMUM						Heating/Cooling Equipment Efficiency[9]
	Glazing Area Percent[1]	Glazing U-Value[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Basement Wall R-Value[6]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	12%	0.90	R-30	R-13	R-13	R-6	R-2	R-7	Normal
2	12%	0.70	R-19	R-13	R-11	R-5	R-0	R-5	Normal
3	15%	0.70	R-30	R-14	R-11	R-5	R-0	R-6	Normal
4	15%	0.60	R-19	R-13	R-11	R-5	R-0	R-6	Normal
5	18%	0.60	R-19	R-13	R-19	R-8	R-2	R-9	Normal
6	18%	0.55	R-30	R-11	R-11	R-5	R-0	R-6	Normal
7	25%	0.45	R-30	R-14	R-11	R-5	R-0	R-6	Normal
8	12%	Any	R-19	R-13	R-11	R-5	R-0	R-6	High Heating
9	15%	0.90	R-19	R-13	R-13	R-5	R-0	R-7	High Heating
10	18%	0.90	R-30	R-15	R-15	R-6	R-2	R-8	High Heating
11	18%	0.75	R-19	R-11	R-13	R-6	R-0	R-7	High Heating
12	25%	0.60	R-30	R-13	R-11	R-5	R-0	R-6	High Heating
13	12%	0.75	R-19	R-11	R-11	R-5	R-0	R-5	High Cooling
14	15%	0.70	R-19	R-13	R-11	R-5	R-0	R-6	High Cooling
15	18%	0.65	R-26	R-13	R-11	R-5	R-0	R-6	High Cooling
16	25%	0.60	R-38	R-19	R-13	R-6	R-2	R-7	High Cooling
17	25%	0.50	R-30	R-13	R-11	R-5	R-0	R-6	High Cooling
18	12%	Any	R-13	R-11	R-13	R-5	R-0	R-6	High Heat/Cool
19	15%	0.90	R-19	R-11	R-11	R-4	R-0	R-5	High Heat/Cool
20	18%	0.90	R-26	R-13	R-11	R-5	R-0	R-6	High Heat/Cool
21	18%	0.75	R-19	R-11	R-11	R-4	R-0	R-5	High Heat/Cool
22	25%	0.70	R-30	R-11	R-15	R-6	R-0	R-8	High Heat/Cool

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Prescriptive Packages - Zone 6

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Package	MAXIMUM		MINIMUM						Heating/Cooling Equipment Efficiency[9]
	Glazing Area Percent[1]	Glazing U-Value[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Basement Wall R-Value[6]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	12%	0.70	R-30	R-14	R-13	R-5	R-2	R-5	Normal
2	12%	0.65	R-38	R-13	R-11	R-4	R-0	R-4	Normal
3	12%	0.60	R-19	R-14	R-13	R-5	R-2	R-5	Normal
4	15%	0.70	R-38	R-14	R-19	R-6	R-6	R-7	Normal
5	15%	0.55	R-30	R-13	R-13	R-5	R-2	R-5	Normal
6	18%	0.60	R-38	R-15	R-19	R-6	R-5	R-7	Normal
7	18%	0.50	R-30	R-13	R-15	R-5	R-2	R-6	Normal
8	22%	0.55	R-38	R-18	R-19	R-6	R-6	R-7	Normal
9	22%	0.45	R-30	R-15	R-15	R-5	R-2	R-6	Normal
10	12%	0.90	R-19	R-15	R-11	R-4	R-0	R-4	High Heating
11	12%	0.90	R-30	R-11	R-11	R-4	R-0	R-4	High Heating
12	15%	0.70	R-19	R-13	R-11	R-4	R-0	R-4	High Heating
13	18%	0.65	R-26	R-11	R-13	R-5	R-2	R-5	High Heating
14	22%	0.55	R-30	R-13	R-11	R-4	R-0	R-4	High Heating
15	12%	0.70	R-19	R-13	R-15	R-5	R-2	R-6	High Cooling
16	12%	0.65	R-30	R-11	R-11	R-4	R-0	R-4	High Cooling
17	15%	0.60	R-30	R-14	R-11	R-4	R-0	R-4	High Cooling
18	18%	0.60	R-30	R-15	R-15	R-5	R-2	R-6	High Cooling
19	22%	0.50	R-30	R-15	R-15	R-5	R-2	R-6	High Cooling
20	12%	Any	R-26	R-13	R-11	R-4	R-0	R-4	High Heat/Cool
21	15%	0.90	R-30	R-14	R-11	R-4	R-0	R-4	High Heat/Cool
22	15%	0.75	R-19	R-11	R-11	R-4	R-0	R-4	High Heat/Cool
23	18%	0.70	R-19	R-14	R-11	R-4	R-0	R-4	High Heat/Cool
24	22%	0.60	R-30	R-11	R-11	R-4	R-0	R-4	High Heat/Cool

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Prescriptive Packages - Zone 7

1993 Model Energy Code for Single-Family Buildings

MECcheck

Package	MAXIMUM		MINIMUM						Heating/Cooling Equipment Efficiency[9]
	Glazing Area Percent[1]	Glazing U-Value[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Basement Wall R-Value[6]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	12%	0.75	R-30	R-14	R-19	R-7	R-5	R-8	Normal
2	12%	0.55	R-19	R-13	R-15	R-6	R-2	R-6	Normal
3	12%	0.55	R-30	R-13	R-11	R-5	R-0	R-5	Normal
4	15%	0.65	R-38	R-19	R-13	R-5	R-2	R-6	Normal
5	15%	0.55	R-30	R-13	R-15	R-6	R-2	R-7	Normal
6	18%	0.60	R-38	R-17	R-19	R-7	R-5	R-8	Normal
7	18%	0.50	R-30	R-13	R-19	R-7	R-4	R-8	Normal
8	22%	0.50	R-38	R-16	R-19	R-7	R-7	R-9	Normal
9	22%	0.40	R-30	R-14	R-15	R-6	R-2	R-7	Normal
10	12%	0.90	R-30	R-13	R-11	R-4	R-0	R-5	High Heating
11	12%	0.75	R-19	R-11	R-11	R-5	R-0	R-5	High Heating
12	15%	0.75	R-19	R-11	R-19	R-7	R-3	R-9	High Heating
13	15%	0.75	R-30	R-14	R-11	R-4	R-0	R-5	High Heating
14	18%	0.65	R-30	R-15	R-11	R-4	R-0	R-5	High Heating
15	18%	0.55	R-19	R-13	R-11	R-4	R-0	R-5	High Heating
16	22%	0.60	R-30	R-15	R-15	R-6	R-2	R-7	High Heating
17	22%	0.55	R-38	R-14	R-11	R-4	R-0	R-5	High Heating
18	12%	0.70	R-30	R-14	R-13	R-5	R-2	R-6	High Cooling
19	15%	0.50	R-30	R-13	R-11	R-5	R-0	R-5	High Cooling
20	18%	0.55	R-30	R-13	R-19	R-7	R-5	R-9	High Cooling
21	22%	0.50	R-38	R-15	R-19	R-7	R-4	R-8	High Cooling
22	12%	0.90	R-19	R-14	R-11	R-4	R-0	R-5	High Heat/Cool
23	15%	0.75	R-19	R-13	R-13	R-5	R-0	R-6	High Heat/Cool
24	18%	0.70	R-30	R-14	R-11	R-4	R-0	R-5	High Heat/Cool
25	22%	0.60	R-38	R-14	R-11	R-4	R-0	R-5	High Heat/Cool

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Prescriptive Packages - Zone 8

1993 Model Energy Code for Single-Family Buildings

MECcheck

Package	MAXIMUM		MINIMUM						Heating/Cooling Equipment Efficiency[9]
	Glazing Area Percent[1]	Glazing U-Value[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Basement Wall R-Value[6]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	12%	0.75	R-38	R-15	R-19	R-8	R-6	R-11	Normal
2	12%	0.65	R-30	R-13	R-19	R-8	R-4	R-10	Normal
3	15%	0.65	R-38	R-19	R-19	R-7	R-2	R-8	Normal
4	15%	0.55	R-30	R-13	R-19	R-8	R-6	R-11	Normal
5	15%	0.40	R-19	R-13	R-15	R-7	R-2	R-8	Normal
6	18%	0.55	R-38	R-19	R-19	R-7	R-2	R-9	Normal
7	18%	0.45	R-30	R-13	R-19	R-7	R-4	R-9	Normal
8	22%	0.45	R-38	R-18	R-19	R-7	R-2	R-8	Normal
9	22%	0.40	R-30	R-15	R-19	R-7	R-3	R-9	Normal
10	12%	Any	R-38	R-15	R-19	R-7	R-2	R-10	High Heating
11	12%	0.90	R-30	R-13	R-15	R-6	R-2	R-7	High Heating
12	15%	0.70	R-30	R-13	R-13	R-5	R-0	R-6	High Heating
13	15%	0.65	R-19	R-13	R-13	R-6	R-2	R-7	High Heating
14	18%	0.65	R-38	R-13	R-13	R-6	R-2	R-7	High Heating
15	18%	0.60	R-30	R-13	R-13	R-5	R-0	R-6	High Heating
16	22%	0.55	R-38	R-13	R-15	R-6	R-2	R-7	High Heating
17	22%	0.50	R-30	R-13	R-13	R-5	R-0	R-6	High Heating
18	12%	0.50	R-19	R-13	R-13	R-6	R-2	R-7	High Cooling
19	15%	0.55	R-30	R-13	R-19	R-7	R-2	R-9	High Cooling
20	18%	0.50	R-30	R-13	R-19	R-8	R-5	R-10	High Cooling
21	22%	0.50	R-38	R-19	R-19	R-7	R-3	R-10	High Cooling
22	12%	0.90	R-30	R-13	R-11	R-5	R-0	R-6	High Heat/Cool
23	15%	0.75	R-30	R-13	R-11	R-5	R-0	R-6	High Heat/Cool
24	18%	0.65	R-30	R-13	R-13	R-5	R-0	R-6	High Heat/Cool
25	22%	0.60	R-38	R-15	R-13	R-6	R-2	R-7	High Heat/Cool

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Prescriptive Packages - Zone 9

1993 Model Energy Code for Single-Family Buildings

MECcheck

Package	MAXIMUM		MINIMUM						Heating/Cooling Equipment Efficiency[9]
	Glazing Area Percent[1]	Glazing U-Value[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Basement Wall R-Value[6]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	12%	0.75	R-38	R-19	R-19	R-9	R-4	R-12	Normal
2	12%	0.55	R-30	R-13	R-19	R-8	R-3	R-11	Normal
3	15%	0.60	R-38	R-19	R-19	R-8	R-3	R-11	Normal
4	15%	0.45	R-30	R-13	R-19	R-8	R-3	R-11	Normal
5	18%	0.50	R-38	R-18	R-19	R-8	R-3	R-11	Normal
6	18%	0.40	R-30	R-13	R-19	R-9	R-4	R-12	Normal
7	22%	0.45	R-38	R-19	R-21	R-10	R-10	R-14	Normal
8	22%	0.35	R-30	R-13	R-19	R-9	R-6	R-13	Normal
9	12%	0.75	R-30	R-13	R-11	R-6	R-0	R-7	High Heating
10	12%	0.75	R-38	R-15	R-11	R-5	R-0	R-5	High Heating
11	15%	0.90	R-38	R-19	R-21	R-9	R-4	R-17	High Heating
12	15%	0.65	R-30	R-13	R-13	R-6	R-0	R-8	High Heating
13	18%	0.65	R-38	R-19	R-13	R-6	R-0	R-7	High Heating
14	18%	0.55	R-30	R-13	R-13	R-6	R-0	R-8	High Heating
15	22%	0.60	R-38	R-19	R-19	R-7	R-2	R-11	High Heating
16	22%	0.50	R-30	R-13	R-15	R-7	R-2	R-10	High Heating
17	12%	0.55	R-30	R-13	R-15	R-8	R-2	R-9	High Cooling
18	15%	0.50	R-30	R-13	R-19	R-9	R-5	R-12	High Cooling
19	18%	0.55	R-38	R-19	R-21	R-9	R-6	R-13	High Cooling
20	22%	0.45	R-38	R-19	R-19	R-9	R-5	R-12	High Cooling
21	12%	0.70	R-26	R-13	R-11	R-5	R-0	R-5	High Heat/Cool
22	15%	0.70	R-30	R-13	R-13	R-6	R-2	R-8	High Heat/Cool
23	18%	0.75	R-38	R-19	R-19	R-7	R-2	R-11	High Heat/Cool
24	22%	0.65	R-38	R-19	R-19	R-8	R-2	R-15	High Heat/Cool

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Prescriptive Packages - Zone 10

1993 Model Energy Code for Single-Family Buildings

Package	MAXIMUM		MINIMUM						Heating/Cooling Equipment Efficiency[9]
	Glazing Area Percent[1]	Glazing U-Value[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Basement Wall R-Value[6]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	12%	0.65	R-38	R-19	R-19	R-8	R-3	R-13	Normal
2	12%	0.50	R-30	R-13	R-19	R-9	R-6	R-16	Normal
3	15%	0.55	R-38	R-19	R-19	R-9	R-5	R-16	Normal
4	15%	0.40	R-30	R-13	R-19	R-9	R-4	R-15	Normal
5	18%	0.45	R-38	R-19	R-19	R-8	R-3	R-14	Normal
6	18%	0.35	R-30	R-13	R-19	R-9	R-5	R-15	Normal
7	22%	0.40	R-38	R-19	R-21	R-10	R-8	R-18	Normal
8	12%	0.75	R-38	R-13	R-13	R-6	R-2	R-10	High Heating
9	12%	0.70	R-30	R-13	R-13	R-6	R-0	R-9	High Heating
10	15%	0.75	R-38	R-15	R-19	R-9	R-2	R-22	High Heating
11	15%	0.60	R-30	R-13	R-13	R-7	R-2	R-11	High Heating
12	18%	0.70	R-38	R-19	R-19	R-9	R-2	R-22	High Heating
13	18%	0.50	R-30	R-13	R-13	R-6	R-2	R-10	High Heating
14	22%	0.55	R-38	R-19	R-19	R-7	R-2	R-14	High Heating
15	22%	0.45	R-30	R-13	R-15	R-7	R-2	R-13	High Heating
16	12%	0.65	R-19	R-13	R-13	R-6	R-2	R-11	High Heat/Cool
17	15%	0.60	R-30	R-13	R-13	R-6	R-0	R-10	High Heat/Cool
18	18%	0.60	R-30	R-13	R-19	R-9	R-2	R-22	High Heat/Cool
19	22%	0.50	R-30	R-13	R-19	R-8	R-2	R-20	High Heat/Cool
20	22%	0.50	R-38	R-19	R-11	R-6	R-0	R-8	High Heat/Cool

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Prescriptive Packages - Zone 11

1993 Model Energy Code for Single-Family Buildings

Package	MAXIMUM		MINIMUM						Heating/Cooling Equipment Efficiency[9]
	Glazing Area Percent[1]	Glazing U-Value[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Basement Wall R-Value[6]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	12%	0.60	R-38	R-19	R-19	R-9	R-7	R-17	Normal
2	12%	0.40	R-30	R-13	R-19	R-9	R-4	R-15	Normal
3	15%	0.45	R-38	R-19	R-19	R-8	R-2	R-12	Normal
4	15%	0.35	R-30	R-13	R-19	R-9	R-7	R-17	Normal
5	18%	0.40	R-38	R-19	R-19	R-9	R-4	R-14	Normal
6	22%	0.40	R-38	R-19	R-30	R-13	--	--	Normal
7	22%	0.35	R-38	R-19	R-19	R-10	R-7	R-17	Normal
8	12%	0.60	R-30	R-13	R-13	R-6	R-0	R-9	High Heating
9	15%	0.75	R-38	R-19	R-19	R-9	R-2	R-20	High Heating
10	18%	0.60	R-38	R-19	R-19	R-7	R-2	R-14	High Heating
11	18%	0.50	R-30	R-13	R-19	R-8	R-2	R-16	High Heating
12	22%	0.50	R-38	R-19	R-19	R-7	R-2	R-14	High Heating
13	22%	0.45	R-30	R-15	R-19	R-8	R-2	R-18	High Heating
14	12%	0.65	R-30	R-13	R-13	R-6	R-0	R-10	High Heat/Cool
15	15%	0.65	R-38	R-13	R-19	R-8	R-2	R-18	High Heat/Cool
16	15%	0.50	R-30	R-13	R-11	R-6	R-0	R-8	High Heat/Cool
17	18%	0.65	R-38	R-19	R-19	R-9	R-2	R-20	High Heat/Cool
18	18%	0.45	R-30	R-13	R-13	R-6	R-0	R-10	High Heat/Cool
19	22%	0.50	R-38	R-19	R-15	R-7	R-2	R-13	High Heat/Cool
20	22%	0.40	R-30	R-15	R-13	R-6	R-0	R-10	High Heat/Cool

-- Hyphens (--) indicate that the package which contains the hyphens cannot be used with the indicated foundation type (slab or crawl space).

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Prescriptive Packages - Zone 12

1993 Model Energy Code for Single-Family Buildings

MECcheck

Package	MAXIMUM		MINIMUM						Heating/Cooling Equipment Efficiency[9]
	Glazing Area Percent[1]	Glazing U-Value[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Basement Wall R-Value[6]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	12%	0.50	R-38	R-19	R-19	R-9	R-5	R-15	Normal
2	12%	0.35	R-30	R-15	R-19	R-9	R-4	R-14	Normal
3	15%	0.40	R-38	R-19	R-19	R-9	R-4	R-14	Normal
4	18%	0.40	R-38	R-19	R-26	R-12	--	R-28	Normal
5	18%	0.35	R-38	R-19	R-19	R-9	R-5	R-15	Normal
6	22%	0.35	R-38	R-19	R-30	R-13	--	--	Normal
7	12%	0.70	R-38	R-19	R-13	R-6	R-0	R-9	High Heating
8	12%	0.55	R-30	R-13	R-13	R-7	R-2	R-11	High Heating
9	15%	0.70	R-38	R-19	R-21	R-9	R-3	R-26	High Heating
10	15%	0.45	R-30	R-13	R-13	R-7	R-2	R-10	High Heating
11	18%	0.50	R-38	R-15	R-19	R-8	R-2	R-18	High Heating
12	18%	0.45	R-30	R-13	R-19	R-8	R-2	R-18	High Heating
13	22%	0.50	R-49	R-19	R-21	R-9	R-3	R-22	High Heating
14	22%	0.40	R-30	R-15	R-19	R-8	R-2	R-18	High Heating
15	12%	0.75	R-38	R-15	R-19	R-8	R-2	R-19	High Heat/Cool
16	12%	0.55	R-30	R-13	R-13	R-6	R-0	R-10	High Heat/Cool
17	15%	0.70	R-38	R-19	R-19	R-9	R-2	R-22	High Heat/Cool
18	15%	0.45	R-30	R-13	R-13	R-6	R-0	R-10	High Heat/Cool
19	18%	0.60	R-38	R-19	R-21	R-9	R-3	R-24	High Heat/Cool
20	18%	0.50	R-30	R-13	R-21	R-10	R-4	R-28	High Heat/Cool
21	22%	0.50	R-38	R-19	R-21	R-9	R-3	R-24	High Heat/Cool

-- Hyphens (--) indicate that the package which contains the hyphens cannot be used with the indicated foundation type (slab or crawl space).

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Prescriptive Packages - Zone 13

1993 Model Energy Code for Single-Family Buildings

MECcheck

Package	MAXIMUM		MINIMUM						Heating/Cooling Equipment Efficiency[9]
	Glazing Area Percent[1]	Glazing U-Value[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Basement Wall R-Value[6]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	12%	0.45	R-38	R-19	R-19	R-10	R-7	R-16	Normal
2	15%	0.40	R-38	R-19	R-26	R-11	R-12	R-22	Normal
3	15%	0.35	R-38	R-19	R-19	R-9	R-5	R-14	Normal
4	18%	0.35	R-38	R-19	R-26	R-11	R-15	R-26	Normal
5	18%	0.35	R-49	R-19	R-21	R-10	R-9	R-19	Normal
6	22%	0.35	R-49	R-21	R-30	R-14	--	--	Normal
7	12%	0.65	R-38	R-15	R-19	R-9	R-3	R-18	High Heating
8	12%	0.55	R-30	R-13	R-19	R-8	R-2	R-16	High Heating
9	15%	0.60	R-38	R-19	R-19	R-8	R-2	R-17	High Heating
10	15%	0.45	R-30	R-13	R-19	R-8	R-2	R-16	High Heating
11	18%	0.50	R-38	R-19	R-19	R-8	R-2	R-16	High Heating
12	18%	0.40	R-30	R-13	R-19	R-8	R-3	R-18	High Heating
13	22%	0.40	R-38	R-15	R-21	R-10	R-4	R-24	High Heating
14	12%	0.75	R-38	R-19	R-19	R-8	R-2	R-16	High Heat/Cool
15	12%	0.60	R-30	R-13	R-19	R-9	R-3	R-20	High Heat/Cool
16	15%	0.65	R-38	R-19	R-21	R-9	R-4	R-24	High Heat/Cool
17	15%	0.50	R-30	R-13	R-19	R-9	R-4	R-22	High Heat/Cool
18	18%	0.55	R-38	R-19	R-21	R-9	R-4	R-24	High Heat/Cool
19	18%	0.40	R-30	R-13	R-19	R-8	R-2	R-16	High Heat/Cool
20	22%	0.45	R-49	R-19	R-19	R-8	R-2	R-17	High Heat/Cool
21	22%	0.40	R-38	R-15	R-19	R-9	R-3	R-22	High Heat/Cool

-- Hyphens (--) indicate that the package which contains the hyphens cannot be used with the indicated foundation type (slab or crawl space).

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Prescriptive Packages - Zone 14

1993 Model Energy Code for Single-Family Buildings

Package	MAXIMUM		MINIMUM						Heating/Cooling Equipment Efficiency[9]
	Glazing Area Percent[1]	Glazing U-Value[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Basement Wall R-Value[6]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	12%	0.45	R-38	R-19	R-26	R-12	--	R-28	Normal
2	12%	0.35	R-38	R-19	R-19	R-9	R-4	R-13	Normal
3	15%	0.40	R-38	R-19	R-30	R-14	--	--	Normal
4	15%	0.35	R-38	R-19	R-26	R-11	R-13	R-22	Normal
5	15%	0.35	R-49	R-19	R-21	R-10	R-8	R-18	Normal
6	18%	0.35	R-38	R-20	R-30	R-14	--	--	Normal
7	18%	0.35	R-49	R-19	R-30	R-13	--	--	Normal
8	12%	0.70	R-38	R-19	R-19	R-9	R-4	R-22	High Heating
9	12%	0.50	R-30	R-13	R-19	R-9	R-3	R-19	High Heating
10	15%	0.45	R-38	R-15	R-19	R-8	R-2	R-15	High Heating
11	15%	0.40	R-30	R-13	R-19	R-8	R-3	R-17	High Heating
12	18%	0.50	R-38	R-19	R-21	R-10	R-6	R-28	High Heating
13	18%	0.35	R-30	R-13	R-19	R-9	R-3	R-18	High Heating
14	22%	0.40	R-38	R-19	R-19	R-9	R-4	R-22	High Heating
15	12%	0.60	R-38	R-15	R-19	R-9	R-3	R-20	High Heat/Cool
16	15%	0.60	R-38	R-19	R-21	R-10	R-5	R-28	High Heat/Cool
17	15%	0.45	R-30	R-13	R-21	R-10	R-5	R-26	High Heat/Cool
18	18%	0.50	R-38	R-19	R-21	R-10	R-5	R-26	High Heat/Cool
19	18%	0.40	R-30	R-15	R-19	R-9	R-4	R-22	High Heat/Cool
20	22%	0.45	R-49	R-19	R-26	R-11	R-7	--	High Heat/Cool

-- Hyphens (--) indicate that the package which contains the hyphens cannot be used with the indicated foundation type (slab or crawl space).

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Prescriptive Packages - Zone 15

1993 Model Energy Code for Single-Family Buildings

Package	MAXIMUM		MINIMUM						Heating/Cooling Equipment Efficiency[9]
	Glazing Area Percent[1]	Glazing U-Value[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Basement Wall R-Value[6]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	12%	0.45	R-38	R-19	R-26	R-13	--	R-30	Normal
2	12%	0.35	R-38	R-19	R-19	R-9	R-5	R-14	Normal
3	15%	0.40	R-38	R-19	R-30	R-15	--	--	Normal
4	15%	0.35	R-38	R-19	R-26	R-12	R-18	R-24	Normal
5	18%	0.35	R-38	R-21	R-30	R-15	--	--	Normal
6	12%	0.55	R-38	R-15	R-19	R-8	R-2	R-15	High Heating
7	15%	0.55	R-38	R-19	R-19	R-9	R-3	R-18	High Heating
8	18%	0.50	R-38	R-19	R-21	R-11	R-7	R-28	High Heating
9	22%	0.45	R-38	R-19	R-30	R-13	R-18	--	High Heating
10	22%	0.40	R-49	R-19	R-19	R-9	R-3	R-17	High Heating
11	12%	0.60	R-38	R-15	R-19	R-9	R-4	R-20	High Heat/Cool
12	15%	0.60	R-38	R-19	R-21	R-11	R-7	R-30	High Heat/Cool
13	15%	0.50	R-49	R-15	R-19	R-9	R-3	R-18	High Heat/Cool
14	18%	0.50	R-49	R-15	R-30	R-13	R-16	--	High Heat/Cool
15	22%	0.45	R-38	R-19	R-26	R-13	R-14	--	High Heat/Cool

-- Hyphens (--) indicate that the package which contains the hyphens cannot be used with the indicated foundation type (slab or crawl space).

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Prescriptive Packages - Zone 16

1993 Model Energy Code for Single-Family Buildings

Package	MAXIMUM		MINIMUM						Heating/Cooling Equipment Efficiency[9]
	Glazing Area Percent[1]	Glazing U-Value[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Basement Wall R-Value[6]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	12%	0.45	R-38	R-19	R-26	R-22	--	R-30	Normal
2	12%	0.35	R-38	R-19	R-19	R-14	R-6	R-14	Normal
3	15%	0.40	R-38	R-19	R-30	R-28	--	--	Normal
4	15%	0.35	R-38	R-19	R-26	R-19	R-19	R-24	Normal
5	18%	0.35	R-49	R-19	R-30	R-26	--	--	Normal
6	12%	0.70	R-38	R-15	R-30	R-26	R-17	--	High Heating
7	15%	0.60	R-38	R-19	R-21	R-18	R-6	R-28	High Heating
8	18%	0.50	R-38	R-19	R-21	R-17	R-5	R-24	High Heating
9	22%	0.40	R-38	R-15	R-26	R-24	R-13	--	High Heating
10	22%	0.35	R-49	R-15	R-19	R-13	R-2	R-15	High Heating
11	12%	0.65	R-49	R-15	R-19	R-16	R-4	R-22	High Heat/Cool
12	12%	0.60	R-38	R-15	R-19	R-15	R-3	R-18	High Heat/Cool
13	15%	0.65	R-38	R-19	R-26	R-24	R-14	--	High Heat/Cool
14	15%	0.50	R-38	R-15	R-19	R-15	R-4	R-20	High Heat/Cool
15	18%	0.50	R-38	R-19	R-19	R-16	R-5	R-24	High Heat/Cool
16	22%	0.45	R-49	R-19	R-26	R-19	R-7	--	High Heat/Cool
17	22%	0.40	R-38	R-19	R-19	R-14	R-3	R-18	High Heat/Cool

-- Hyphens (--) indicate that the package which contains the hyphens cannot be used with the indicated foundation type (slab or crawl space).

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Prescriptive Packages - Zone 17

1993 Model Energy Code for Single-Family Buildings

Package	MAXIMUM		MINIMUM						Heating/Cooling Equipment Efficiency[9]
	Glazing Area Percent[1]	Glazing U-Value[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Basement Wall R-Value[6]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	12%	0.50	R-49	R-18	R-30	R-28	--	--	Normal
2	12%	0.40	R-38	R-19	R-21	R-18	R-17	R-19	Normal
3	15%	0.40	R-38	R-19	R-30	R-30	--	--	Normal
4	15%	0.35	R-49	R-19	R-21	R-17	R-16	R-19	Normal
5	18%	0.35	R-38	R-21	R-30	R-28	--	--	Normal
6	18%	0.35	R-49	R-26	R-21	R-19	--	R-22	Normal
7	12%	0.65	R-38	R-18	R-15	R-13	R-3	R-14	High Heating
8	15%	0.60	R-38	R-20	R-19	R-17	R-7	R-24	High Heating
9	15%	0.55	R-49	R-18	R-15	R-13	R-3	R-14	High Heating
10	18%	0.55	R-49	R-21	R-21	R-20	R-10	R-30	High Heating
11	18%	0.50	R-38	R-19	R-19	R-17	R-7	R-24	High Heating
12	22%	0.45	R-38	R-18	R-26	R-26	--	--	High Heating
13	22%	0.45	R-49	R-20	R-21	R-19	R-9	R-28	High Heating

-- Hyphens (--) indicate that the package which contains the hyphens cannot be used with the indicated foundation type (slab or crawl space).

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Prescriptive Packages - Zone 18

1993 Model Energy Code for Single-Family Buildings

Package	MAXIMUM		MINIMUM						Heating/Cooling Equipment Efficiency[9]
	Glazing Area Percent[1]	Glazing U-Value[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Basement Wall R-Value[6]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	12%	0.40	R-49	R-19	R-26	R-24	--	R-30	Normal
2	12%	0.35	R-38	R-21	R-21	R-18	--	R-20	Normal
3	15%	0.35	R-38	R-21	R-30	R-28	--	--	Normal
4	15%	0.35	R-49	R-28	R-21	R-18	R-19	R-19	Normal
5	18%	0.35	R-49	R-28	R-30	R-28	--	--	Normal
6	18%	0.30	R-49	R-28	R-21	R-18	R-20	R-20	Normal
7	12%	0.55	R-38	R-19	R-15	R-13	R-3	R-13	High Heating
8	12%	0.55	R-49	R-15	R-19	R-17	R-7	R-22	High Heating
9	15%	0.55	R-38	R-21	R-21	R-20	R-11	R-30	High Heating
10	15%	0.55	R-49	R-19	R-21	R-19	R-10	R-28	High Heating
11	18%	0.50	R-38	R-19	R-30	R-30	--	--	High Heating
12	18%	0.50	R-49	R-19	R-26	R-26	--	--	High Heating
13	22%	0.45	R-49	R-22	R-30	--	--	--	High Heating
14	22%	0.40	R-49	R-21	R-21	R-19	R-10	R-28	High Heating
15	22%	0.35	R-38	R-18	R-19	R-17	R-6	R-22	High Heating

-- Hyphens (--) indicate that the package which contains the hyphens cannot be used with the indicated foundation type (basement, slab, or crawl space).

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Prescriptive Packages - Zone 19

1993 Model Energy Code for Single-Family Buildings

Package	MAXIMUM		MINIMUM						Heating/Cooling Equipment Efficiency [9]
	Glazing Area Percent [1]	Glazing U-Value [2]	Ceiling R-Value [3]	Wall R-Value [4]	Floor R-Value [5]	Basement Wall R-Value [6]	Slab Perimeter R-Value [7]	Crawl Space Wall R-Value [8]	
1	12%	0.35	R-38	R-21	R-30	R-19	--	R-22	Normal
2	12%	0.35	R-49	R-19	R-30	R-19	--	R-22	Normal
3	12%	0.35	R-49	R-28	R-21	R-13	R-8	R-12	Normal
4	15%	0.35	R-49	R-28	R-30	R-19	--	R-20	Normal
5	15%	0.30	R-49	R-21	R-30	R-18	--	R-19	Normal
6	18%	0.30	R-49	R-28	R-30	R-19	--	R-22	Normal
7	12%	0.55	R-38	R-19	R-21	R-13	R-4	R-14	High Heating
8	12%	0.55	R-49	R-19	R-19	R-12	R-3	R-12	High Heating
9	15%	0.45	R-38	R-19	R-21	R-13	R-4	R-15	High Heating
10	15%	0.45	R-49	R-19	R-19	R-12	R-3	R-12	High Heating
11	18%	0.40	R-49	R-19	R-21	R-13	R-4	R-14	High Heating
12	18%	0.35	R-38	R-17	R-19	R-12	R-3	R-13	High Heating
13	22%	0.35	R-38	R-19	R-26	R-17	R-9	R-22	High Heating
14	22%	0.35	R-49	R-21	R-21	R-14	R-5	R-15	High Heating

-- Hyphens (--) indicate that the package which contains the hyphens cannot be used with the indicated foundation type (slab or crawl space).

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Prescriptive Packages - Zone 1

1993 Model Energy Code for Multifamily Buildings

Package	MAXIMUM		MINIMUM					Heating/Cooling Equipment Efficiency[9]
	Glazing Area Percent[1]	Glazing U-Value[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	25%	Any	R-13	R-11	R-11	R-0	R-0	Normal
2	30%	0.90	R-13	R-11	R-11	R-0	R-0	Normal
3	30%	Any	R-13	R-11	R-11	R-0	R-0	High Cooling

Prescriptive Packages - Zone 2

1993 Model Energy Code for Multifamily Buildings

Package	MAXIMUM		MINIMUM					
	Glazing Area Percent [1]	Glazing U-Value [2]	Ceiling R-Value [3]	Wall R-Value [4]	Floor R-Value [5]	Slab Perimeter R-Value [7]	Crawl Space Wall R-Value [8]	Heating/Cooling Equipment Efficiency [9]
1	15%	Any	R-13	R-11	R-11	R-0	R-2	Normal
2	20%	Any	R-13	R-11	R-11	R-0	R-2	Normal
3	25%	Any	R-26	R-11	R-11	R-0	R-5	Normal
4	25%	0.90	R-13	R-11	R-11	R-0	R-3	Normal
5	30%	0.75	R-13	R-11	R-11	R-0	R-3	Normal
6	15%	Any	R-13	R-11	R-0	R-0	R-0	High Cooling
7	20%	Any	R-13	R-11	R-11	R-0	R-0	High Cooling
8	25%	Any	R-13	R-11	R-11	R-0	R-2	High Cooling
9	30%	Any	R-13	R-11	R-11	R-0	R-3	High Cooling

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Prescriptive Packages - Zone 3

1993 Model Energy Code for Multifamily Buildings

Package	MAXIMUM		MINIMUM					Heating/Cooling Equipment Efficiency[9]
	Glazing Area Percent[1]	Glazing U-Value[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	15%	Any	R-13	R-11	R-11	R-0	R-2	Normal
2	20%	Any	R-19	R-11	R-11	R-0	R-4	Normal
3	20%	0.90	R-13	R-11	R-11	R-0	R-3	Normal
4	25%	0.90	R-19	R-11	R-13	R-2	R-6	Normal
5	25%	0.75	R-13	R-11	R-11	R-0	R-3	Normal
6	30%	0.75	R-19	R-11	R-11	R-0	R-5	Normal
7	30%	0.70	R-13	R-11	R-11	R-0	R-5	Normal
8	20%	Any	R-13	R-11	R-11	R-0	R-2	High Cooling
9	25%	Any	R-19	R-11	R-11	R-0	R-5	High Cooling
10	25%	0.90	R-13	R-11	R-11	R-0	R-2	High Cooling
11	30%	0.90	R-19	R-11	R-11	R-0	R-5	High Cooling
12	30%	0.75	R-13	R-11	R-11	R-0	R-2	High Cooling

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Prescriptive Packages - Zone 4

1993 Model Energy Code for Multifamily Buildings

MECcheck

Package	MAXIMUM		MINIMUM						Heating/Cooling Equipment Efficiency[9]
	Glazing Area Percent[1]	Glazing U-Value[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Basement Wall R-Value[6]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	15%	Any	R-13	R-11	R-11	R-4	R-0	R-5	Normal
2	20%	0.90	R-19	R-11	R-11	R-4	R-0	R-5	Normal
3	20%	0.75	R-13	R-11	R-11	R-3	R-0	R-3	Normal
4	25%	0.75	R-19	R-11	R-11	R-5	R-0	R-5	Normal
5	30%	0.70	R-30	R-14	R-11	R-5	R-0	R-5	Normal
6	30%	0.65	R-19	R-13	R-11	R-5	R-0	R-5	Normal
7	15%	Any	R-13	R-11	R-11	R-2	R-0	R-2	High Heating
8	20%	Any	R-13	R-11	R-11	R-4	R-0	R-4	High Heating
9	25%	0.90	R-13	R-11	R-13	R-5	R-0	R-6	High Heating
10	30%	0.75	R-13	R-11	R-11	R-4	R-0	R-5	High Heating
11	15%	Any	R-13	R-11	R-11	R-3	R-0	R-2	High Cooling
12	20%	Any	R-19	R-13	R-11	R-5	R-0	R-5	High Cooling
13	20%	0.90	R-13	R-11	R-11	R-4	R-0	R-3	High Cooling
14	25%	0.90	R-30	R-11	R-11	R-5	R-0	R-5	High Cooling
15	25%	0.75	R-13	R-11	R-11	R-4	R-0	R-4	High Cooling
16	30%	0.70	R-19	R-11	R-11	R-4	R-0	R-4	High Cooling
17	30%	0.65	R-13	R-11	R-11	R-4	R-0	R-4	High Cooling
18	15%	Any	R-13	R-11	R-11	R-2	R-0	R-2	High Heat/Cool
19	20%	Any	R-13	R-11	R-11	R-2	R-0	R-2	High Heat/Cool
20	25%	Any	R-19	R-11	R-11	R-4	R-0	R-5	High Heat/Cool
21	25%	0.90	R-13	R-11	R-11	R-2	R-0	R-2	High Heat/Cool
22	30%	0.90	R-19	R-11	R-11	R-4	R-0	R-4	High Heat/Cool
23	30%	0.75	R-11	R-11	R-11	R-2	R-0	R-2	High Heat/Cool

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Prescriptive Packages - Zone 5

1993 Model Energy Code for Multifamily Buildings

MECcheck

Package	MAXIMUM		MINIMUM						Heating/Cooling Equipment Efficiency[9]
	Glazing Area Percent[1]	Glazing U-Value[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Basement Wall R-Value[6]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	15%	0.90	R-19	R-11	R-11	R-4	R-0	R-4	Normal
2	15%	0.75	R-13	R-11	R-11	R-4	R-0	R-3	Normal
3	20%	0.75	R-19	R-13	R-11	R-5	R-0	R-5	Normal
4	25%	0.65	R-30	R-11	R-11	R-5	R-0	R-5	Normal
5	25%	0.60	R-19	R-11	R-11	R-5	R-0	R-5	Normal
6	30%	0.55	R-30	R-11	R-11	R-5	R-0	R-5	Normal
7	15%	Any	R-13	R-11	R-11	R-3	R-0	R-3	High Heating
8	20%	0.90	R-13	R-11	R-11	R-5	R-0	R-6	High Heating
9	25%	0.75	R-13	R-11	R-11	R-5	R-0	R-7	High Heating
10	30%	0.75	R-30	R-13	R-11	R-5	R-0	R-7	High Heating
11	15%	Any	R-19	R-11	R-11	R-5	R-0	R-6	High Cooling
12	20%	0.90	R-26	R-13	R-11	R-5	R-0	R-6	High Cooling
13	20%	0.75	R-13	R-11	R-11	R-5	R-0	R-6	High Cooling
14	25%	0.70	R-19	R-13	R-11	R-5	R-0	R-6	High Cooling
15	30%	0.60	R-26	R-11	R-11	R-5	R-0	R-5	High Cooling
16	15%	Any	R-13	R-11	R-11	R-2	R-0	R-2	High Heat/Cool
17	20%	Any	R-13	R-13	R-11	R-5	R-0	R-7	High Heat/Cool
18	25%	0.90	R-19	R-11	R-11	R-5	R-0	R-6	High Heat/Cool
19	30%	0.75	R-13	R-13	R-13	R-6	R-0	R-8	High Heat/Cool
20	30%	0.70	R-13	R-11	R-11	R-5	R-0	R-6	High Heat/Cool

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Prescriptive Packages - Zone 6

1993 Model Energy Code for Multifamily Buildings

MECcheck

Package	MAXIMUM		MINIMUM						Heating/Cooling Equipment Efficiency[9]
	Glazing Area Percent[1]	Glazing U-Value[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Basement Wall R-Value[6]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	15%	0.75	R-30	R-13	R-11	R-4	R-0	R-4	Normal
2	15%	0.65	R-19	R-11	R-13	R-4	R-0	R-4	Normal
3	20%	0.60	R-30	R-14	R-13	R-4	R-0	R-4	Normal
4	20%	0.50	R-19	R-11	R-13	R-4	R-0	R-4	Normal
5	25%	0.55	R-38	R-19	R-11	R-4	R-0	R-4	Normal
6	25%	0.50	R-30	R-14	R-13	R-4	R-0	R-4	Normal
7	30%	0.50	R-38	R-15	R-19	R-6	R-6	R-7	Normal
8	30%	0.40	R-30	R-11	R-13	R-4	R-0	R-4	Normal
9	15%	0.75	R-13	R-11	R-11	R-3	R-0	R-3	High Heating
10	20%	0.75	R-19	R-13	R-11	R-4	R-0	R-4	High Heating
11	25%	0.70	R-38	R-13	R-13	R-4	R-0	R-4	High Heating
12	25%	0.60	R-19	R-11	R-11	R-4	R-0	R-4	High Heating
13	30%	0.55	R-30	R-11	R-11	R-4	R-0	R-4	High Heating
14	15%	0.75	R-19	R-13	R-11	R-4	R-0	R-4	High Cooling
15	15%	0.65	R-13	R-13	R-11	R-4	R-0	R-4	High Cooling
16	20%	0.65	R-30	R-13	R-11	R-4	R-0	R-4	High Cooling
17	25%	0.55	R-30	R-15	R-11	R-4	R-0	R-4	High Cooling
18	30%	0.55	R-38	R-19	R-15	R-5	R-2	R-6	High Cooling
19	30%	0.45	R-30	R-13	R-11	R-4	R-0	R-4	High Cooling
20	15%	0.90	R-13	R-11	R-11	R-3	R-0	R-3	High Heat/Cool
21	20%	0.75	R-13	R-11	R-13	R-4	R-0	R-4	High Heat/Cool
22	25%	0.75	R-26	R-13	R-13	R-4	R-0	R-5	High Heat/Cool
23	25%	0.60	R-13	R-11	R-11	R-4	R-0	R-4	High Heat/Cool
24	30%	0.60	R-19	R-13	R-13	R-4	R-0	R-5	High Heat/Cool

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Prescriptive Packages - Zone 7

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Package	MAXIMUM		MINIMUM						Heating/Cooling Equipment Efficiency[9]
	Glazing Area Percent[1]	Glazing U-Value[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Basement Wall R-Value[6]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	15%	0.75	R-30	R-13	R-11	R-4	R-0	R-4	Normal
2	15%	0.65	R-19	R-11	R-13	R-5	R-0	R-5	Normal
3	20%	0.60	R-30	R-15	R-11	R-4	R-0	R-4	Normal
4	20%	0.50	R-19	R-11	R-13	R-5	R-0	R-5	Normal
5	25%	0.55	R-30	R-13	R-19	R-7	R-5	R-9	Normal
6	25%	0.45	R-26	R-11	R-13	R-5	R-0	R-5	Normal
7	30%	0.45	R-38	R-13	R-15	R-5	R-2	R-6	Normal
8	30%	0.40	R-30	R-13	R-11	R-4	R-0	R-4	Normal
9	15%	Any	R-30	R-11	R-13	R-5	R-0	R-5	High Heating
10	15%	0.90	R-19	R-11	R-11	R-4	R-0	R-3	High Heating
11	20%	0.75	R-19	R-13	R-11	R-4	R-0	R-4	High Heating
12	25%	0.70	R-26	R-15	R-13	R-5	R-0	R-5	High Heating
13	25%	0.60	R-19	R-11	R-11	R-4	R-0	R-4	High Heating
14	30%	0.55	R-30	R-11	R-11	R-4	R-0	R-4	High Heating
15	15%	0.75	R-19	R-13	R-13	R-5	R-0	R-5	High Cooling
16	20%	0.60	R-26	R-13	R-11	R-4	R-0	R-4	High Cooling
17	20%	0.55	R-19	R-11	R-13	R-5	R-0	R-5	High Cooling
18	25%	0.50	R-38	R-11	R-11	R-4	R-0	R-4	High Cooling
19	25%	0.45	R-19	R-13	R-11	R-4	R-0	R-4	High Cooling
20	30%	0.45	R-30	R-15	R-11	R-4	R-0	R-4	High Cooling
21	20%	0.90	R-30	R-14	R-11	R-4	R-0	R-5	High Heat/Cool
22	20%	0.75	R-13	R-11	R-13	R-5	R-0	R-6	High Heat/Cool
23	25%	0.70	R-30	R-11	R-11	R-4	R-0	R-5	High Heat/Cool
24	25%	0.60	R-13	R-11	R-13	R-4	R-0	R-5	High Heat/Cool
25	30%	0.55	R-19	R-11	R-11	R-4	R-0	R-4	High Heat/Cool

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Prescriptive Package - Zone 8

1993 Model Energy Code for Multifamily Buildings

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Package	MAXIMUM		MINIMUM						Heating/Cooling Equipment Efficiency[9]
	Glazing Area Percent[1]	Glazing U-Value[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Basement Wall R-Value[6]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	15%	0.70	R-30	R-11	R-11	R-5	R-0	R-5	Normal
2	15%	0.60	R-19	R-11	R-11	R-4	R-0	R-4	Normal
3	20%	0.60	R-30	R-15	R-11	R-5	R-0	R-5	Normal
4	20%	0.50	R-19	R-11	R-13	R-5	R-0	R-5	Normal
5	25%	0.55	R-30	R-13	R-19	R-8	R-6	R-11	Normal
6	25%	0.45	R-26	R-11	R-13	R-5	R-0	R-5	Normal
7	30%	0.45	R-38	R-13	R-15	R-6	R-2	R-7	Normal
8	30%	0.40	R-30	R-13	R-11	R-5	R-0	R-4	Normal
9	15%	Any	R-26	R-11	R-13	R-5	R-0	R-7	High Heating
10	15%	0.90	R-19	R-11	R-11	R-4	R-0	R-4	High Heating
11	20%	0.75	R-19	R-11	R-11	R-5	R-0	R-5	High Heating
12	25%	0.70	R-26	R-14	R-13	R-5	R-0	R-6	High Heating
13	25%	0.60	R-19	R-11	R-11	R-4	R-0	R-5	High Heating
14	30%	0.55	R-26	R-11	R-11	R-5	R-0	R-5	High Heating
15	15%	0.75	R-26	R-11	R-13	R-5	R-0	R-5	High Cooling
16	15%	0.65	R-19	R-11	R-11	R-4	R-0	R-4	High Cooling
17	20%	0.60	R-26	R-13	R-11	R-5	R-0	R-5	High Cooling
18	20%	0.55	R-19	R-13	R-11	R-5	R-0	R-5	High Cooling
19	25%	0.45	R-19	R-13	R-11	R-5	R-0	R-5	High Cooling
20	30%	0.45	R-38	R-14	R-11	R-5	R-0	R-5	High Cooling
21	15%	Any	R-19	R-11	R-13	R-5	R-0	R-6	High Heat/Cool
22	20%	0.90	R-30	R-14	R-11	R-5	R-0	R-5	High Heat/Cool
23	20%	0.75	R-13	R-11	R-13	R-5	R-0	R-7	High Heat/Cool
24	25%	0.70	R-30	R-11	R-11	R-5	R-0	R-5	High Heat/Cool
25	30%	0.65	R-30	R-13	R-15	R-6	R-2	R-8	High Heat/Cool

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Prescriptive Packages - Zone 9

1993 Model Energy Code for Multifamily Buildings

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Package	MAXIMUM		MINIMUM						Heating/Cooling Equipment Efficiency[9]
	Glazing Area Percent[1]	Glazing U-Value[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Basement Wall R-Value[6]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	15%	0.65	R-30	R-11	R-11	R-5	R-0	R-4	Normal
2	15%	0.55	R-13	R-13	R-13	R-6	R-0	R-6	Normal
3	20%	0.60	R-38	R-13	R-13	R-6	R-0	R-6	Normal
4	20%	0.60	R-26	R-15	R-13	R-6	R-2	R-7	Normal
5	20%	0.50	R-19	R-13	R-11	R-5	R-0	R-5	Normal
6	25%	0.60	R-38	R-17	R-19	R-9	R-6	R-13	Normal
7	25%	0.45	R-26	R-13	R-11	R-5	R-0	R-5	Normal
8	30%	0.40	R-30	R-11	R-13	R-6	R-2	R-7	Normal
9	15%	0.90	R-13	R-13	R-13	R-5	R-0	R-6	High Heating
10	20%	0.75	R-19	R-13	R-11	R-5	R-0	R-5	High Heating
11	20%	0.65	R-13	R-11	R-11	R-5	R-0	R-6	High Heating
12	25%	0.70	R-30	R-13	R-13	R-6	R-0	R-8	High Heating
13	25%	0.55	R-13	R-13	R-11	R-5	R-0	R-5	High Heating
14	30%	0.60	R-38	R-15	R-11	R-5	R-0	R-6	High Heating
15	15%	0.75	R-19	R-16	R-11	R-5	R-0	R-5	High Cooling
16	20%	0.60	R-30	R-13	R-13	R-6	R-0	R-6	High Cooling
17	25%	0.50	R-30	R-13	R-13	R-6	R-0	R-6	High Cooling
18	30%	0.45	R-30	R-13	R-15	R-7	R-2	R-9	High Cooling
19	15%	0.90	R-13	R-11	R-11	R-5	R-0	R-6	High Heat/Cool
20	20%	0.70	R-13	R-11	R-13	R-6	R-0	R-7	High Heat/Cool
21	25%	0.70	R-30	R-13	R-11	R-5	R-0	R-6	High Heat/Cool
22	25%	0.60	R-13	R-13	R-13	R-6	R-0	R-7	High Heat/Cool
23	30%	0.60	R-30	R-11	R-13	R-6	R-2	R-8	High Heat/Cool
24	30%	0.50	R-13	R-13	R-11	R-5	R-0	R-6	High Heat/Cool

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Prescriptive Packages - Zone 10

1993 Model Energy Code for Multifamily Buildings

Package	MAXIMUM		MINIMUM						Heating/Cooling Equipment Efficiency[9]
	Glazing Area Percent[1]	Glazing U-Value[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Basement Wall R-Value[6]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	15%	0.70	R-30	R-13	R-11	R-5	R-0	R-6	Normal
2	15%	0.50	R-13	R-13	R-11	R-5	R-0	R-5	Normal
3	20%	0.65	R-38	R-19	R-11	R-5	R-0	R-6	Normal
4	20%	0.55	R-30	R-13	R-11	R-5	R-0	R-6	Normal
5	25%	0.45	R-26	R-13	R-13	R-6	R-0	R-7	Normal
6	30%	0.45	R-38	R-14	R-15	R-7	R-2	R-11	Normal
7	30%	0.40	R-30	R-13	R-13	R-6	R-0	R-7	Normal
8	15%	0.75	R-13	R-11	R-11	R-4	R-0	R-4	High Heating
9	20%	0.75	R-19	R-13	R-11	R-5	R-0	R-7	High Heating
10	20%	0.70	R-13	R-13	R-13	R-6	R-0	R-8	High Heating
11	25%	0.75	R-30	R-13	R-19	R-10	R-4	R-26	High Heating
12	25%	0.60	R-19	R-11	R-11	R-5	R-0	R-7	High Heating
13	30%	0.65	R-38	R-13	R-19	R-10	R-4	R-28	High Heating
14	30%	0.55	R-30	R-11	R-11	R-5	R-0	R-7	High Heating
15	15%	0.90	R-13	R-11	R-13	R-6	R-0	R-9	High Heat/Cool
16	20%	0.75	R-19	R-11	R-11	R-5	R-0	R-7	High Heat/Cool
17	20%	0.70	R-13	R-11	R-13	R-6	R-0	R-9	High Heat/Cool
18	25%	0.70	R-30	R-13	R-13	R-6	R-0	R-8	High Heat/Cool
19	25%	0.65	R-19	R-13	R-13	R-6	R-0	R-8	High Heat/Cool
20	30%	0.60	R-38	R-13	R-11	R-5	R-0	R-8	High Heat/Cool
21	30%	0.55	R-19	R-13	R-13	R-6	R-0	R-8	High Heat/Cool

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Prescriptive Packages - Zone 11

1993 Model Energy Code for Multifamily Buildings

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Package	MAXIMUM		MINIMUM						Heating/Cooling Equipment Efficiency[9]
	Glazing Area Percent[1]	Glazing U-Value[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Basement Wall R-Value[6]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	15%	0.70	R-30	R-13	R-11	R-5	R-0	R-6	Normal
2	15%	0.50	R-13	R-13	R-11	R-5	R-0	R-6	Normal
3	20%	0.60	R-30	R-13	R-15	R-7	R-2	R-10	Normal
4	20%	0.50	R-26	R-11	R-11	R-6	R-0	R-6	Normal
5	25%	0.50	R-38	R-16	R-11	R-5	R-0	R-6	Normal
6	25%	0.45	R-30	R-13	R-13	R-6	R-0	R-6	Normal
7	30%	0.45	R-38	R-15	R-15	R-8	R-2	R-11	Normal
8	30%	0.45	R-38	R-18	R-13	R-6	R-2	R-7	Normal
9	15%	0.90	R-13	R-13	R-13	R-6	R-0	R-8	High Heating
10	15%	0.75	R-13	R-11	R-11	R-4	R-0	R-4	High Heating
11	20%	0.75	R-19	R-11	R-13	R-6	R-0	R-9	High Heating
12	20%	0.65	R-13	R-11	R-11	R-5	R-0	R-7	High Heating
13	25%	0.70	R-38	R-13	R-13	R-6	R-0	R-9	High Heating
14	25%	0.60	R-19	R-11	R-11	R-5	R-0	R-7	High Heating
15	30%	0.65	R-38	R-13	R-19	R-10	R-5	R-30	High Heating
16	30%	0.55	R-30	R-11	R-11	R-5	R-0	R-7	High Heating
17	15%	Any	R-26	R-13	R-11	R-5	R-0	R-7	High Heat/Cool
18	15%	0.90	R-13	R-11	R-13	R-6	R-0	R-9	High Heat/Cool
19	20%	0.75	R-19	R-11	R-11	R-5	R-0	R-7	High Heat/Cool
20	20%	0.65	R-13	R-11	R-11	R-5	R-0	R-6	High Heat/Cool
21	25%	0.70	R-30	R-13	R-13	R-6	R-0	R-9	High Heat/Cool
22	25%	0.55	R-13	R-11	R-11	R-5	R-0	R-7	High Heat/Cool
23	30%	0.60	R-30	R-13	R-13	R-6	R-0	R-9	High Heat/Cool
24	30%	0.55	R-19	R-13	R-13	R-6	R-0	R-8	High Heat/Cool

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Prescriptive Packages - Zone 12

1993 Model Energy Code for Multifamily Buildings

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Package	MAXIMUM		MINIMUM						Heating/Cooling Equipment Efficiency[9]
	Glazing Area Percent[1]	Glazing U-Value[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Basement Wall R-Value[6]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	15%	0.70	R-30	R-13	R-11	R-6	R-0	R-6	Normal
2	15%	0.55	R-19	R-11	R-11	R-5	R-0	R-5	Normal
3	20%	0.60	R-26	R-13	R-19	R-9	R-3	R-13	Normal
4	20%	0.55	R-38	R-13	R-11	R-5	R-0	R-6	Normal
5	20%	0.50	R-26	R-11	R-13	R-6	R-0	R-6	Normal
6	25%	0.50	R-26	R-13	R-19	R-9	R-5	R-15	Normal
7	25%	0.45	R-30	R-14	R-11	R-5	R-0	R-6	Normal
8	30%	0.45	R-38	R-13	R-19	R-9	R-4	R-14	Normal
9	15%	0.90	R-19	R-11	R-11	R-5	R-0	R-5	High Heating
10	20%	0.75	R-19	R-11	R-13	R-6	R-0	R-9	High Heating
11	20%	0.65	R-13	R-11	R-11	R-5	R-0	R-7	High Heating
12	25%	0.70	R-30	R-13	R-13	R-7	R-2	R-11	High Heating
13	25%	0.60	R-19	R-11	R-11	R-5	R-0	R-7	High Heating
14	30%	0.60	R-26	R-13	R-15	R-8	R-2	R-14	High Heating
15	15%	0.90	R-13	R-13	R-11	R-5	R-0	R-7	High Heat/Cool
16	20%	0.75	R-19	R-11	R-11	R-5	R-0	R-7	High Heat/Cool
17	25%	0.70	R-38	R-11	R-13	R-6	R-0	R-9	High Heat/Cool
18	25%	0.60	R-19	R-11	R-11	R-5	R-0	R-6	High Heat/Cool
19	30%	0.60	R-30	R-13	R-13	R-6	R-0	R-9	High Heat/Cool

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Prescriptive Packages - Zone 13

1993 Model Energy Code for Multifamily Buildings

Package	MAXIMUM		MINIMUM						Heating/Cooling Equipment Efficiency[9]
	Glazing Area Percent[1]	Glazing U-Value[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Basement Wall R-Value[6]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	15%	0.60	R-30	R-14	R-11	R-5	R-0	R-6	Normal
2	15%	0.50	R-19	R-13	R-11	R-5	R-0	R-6	Normal
3	20%	0.55	R-38	R-14	R-15	R-8	R-2	R-10	Normal
4	20%	0.45	R-30	R-13	R-11	R-5	R-0	R-6	Normal
5	25%	0.50	R-38	R-19	R-15	R-8	R-2	R-10	Normal
6	25%	0.40	R-30	R-13	R-13	R-6	R-2	R-7	Normal
7	30%	0.40	R-38	R-13	R-19	R-9	R-5	R-15	Normal
8	15%	0.75	R-13	R-13	R-11	R-5	R-0	R-6	High Heating
9	20%	0.70	R-26	R-13	R-11	R-5	R-0	R-6	High Heating
10	20%	0.55	R-13	R-11	R-11	R-5	R-0	R-6	High Heating
11	25%	0.60	R-30	R-13	R-11	R-5	R-0	R-7	High Heating
12	25%	0.55	R-19	R-13	R-11	R-5	R-0	R-7	High Heating
13	30%	0.55	R-38	R-13	R-13	R-7	R-2	R-11	High Heating
14	30%	0.50	R-26	R-13	R-11	R-5	R-0	R-7	High Heating

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Prescriptive Packages - Zone 14

1993 Model Energy Code for Multifamily Buildings

MECcheck

Package	MAXIMUM		MINIMUM						Heating/Cooling Equipment Efficiency[9]
	Glazing Area Percent[1]	Glazing U-Value[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Basement Wall R-Value[6]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	15%	0.50	R-38	R-13	R-11	R-5	R-0	R-6	Normal
2	15%	0.55	R-30	R-14	R-13	R-7	R-2	R-8	Normal
3	20%	0.50	R-38	R-13	R-19	R-10	R-7	R-17	Normal
4	20%	0.45	R-30	R-14	R-15	R-8	R-2	R-10	Normal
5	25%	0.45	R-49	R-18	R-15	R-8	R-3	R-11	Normal
6	25%	0.40	R-30	R-14	R-19	R-9	R-6	R-15	Normal
7	30%	0.35	R-38	R-13	R-19	R-9	R-6	R-15	Normal
8	15%	0.75	R-26	R-11	R-11	R-5	R-0	R-6	High Heating
9	15%	0.70	R-19	R-11	R-11	R-5	R-0	R-7	High Heating
10	20%	0.65	R-30	R-13	R-11	R-6	R-2	R-8	High Heating
11	20%	0.60	R-26	R-11	R-11	R-6	R-0	R-7	High Heating
12	20%	0.55	R-19	R-11	R-11	R-5	R-0	R-7	High Heating
13	25%	0.60	R-38	R-11	R-19	R-10	R-5	R-26	High Heating
14	25%	0.55	R-30	R-13	R-13	R-6	R-2	R-9	High Heating
15	25%	0.50	R-19	R-15	R-11	R-6	R-0	R-8	High Heating
16	30%	0.55	R-38	R-19	R-15	R-8	R-2	R-14	High Heating
17	30%	0.45	R-30	R-13	R-11	R-5	R-0	R-7	High Heating

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Prescriptive Packages - Zone 15

1993 Model Energy Code for Multifamily Buildings

MECcheck

Package	MAXIMUM		MINIMUM						Heating/Cooling Equipment Efficiency[9]
	Glazing Area Percent[1]	Glazing U-Value[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Basement Wall R-Value[6]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	12%	0.45	R-30	R-13	R-19	R-11	R-9	R-18	Normal
2	12%	0.55	R-38	R-18	R-15	R-8	R-3	R-11	Normal
3	15%	0.45	R-49	R-14	R-21	R-11	R-12	R-20	Normal
4	15%	0.40	R-38	R-13	R-19	R-11	R-9	R-18	Normal
5	20%	0.40	R-49	R-18	R-19	R-10	R-9	R-17	Normal
6	20%	0.35	R-38	R-19	R-15	R-8	R-2	R-10	Normal
7	25%	0.35	R-49	R-20	R-21	R-12	R-15	R-22	Normal
8	25%	0.30	R-49	R-18	R-15	R-8	R-3	R-11	Normal
9	30%	0.30	R-49	R-23	R-19	R-11	R-9	R-18	Normal
10	12%	0.75	R-30	R-13	R-13	R-8	R-2	R-11	High Heating
11	12%	0.65	R-38	R-11	R-11	R-6	R-0	R-7	High Heating
12	15%	0.60	R-38	R-13	R-13	R-6	R-2	R-9	High Heating
13	15%	0.50	R-30	R-11	R-11	R-6	R-0	R-7	High Heating
14	15%	0.45	R-19	R-13	R-11	R-5	R-0	R-6	High Heating
15	20%	0.60	R-49	R-19	R-15	R-8	R-2	R-14	High Heating
16	20%	0.50	R-38	R-13	R-15	R-8	R-2	R-13	High Heating
17	25%	0.50	R-49	R-16	R-19	R-11	R-6	R-28	High Heating
18	25%	0.40	R-38	R-13	R-13	R-7	R-2	R-10	High Heating
19	30%	0.40	R-49	R-19	R-13	R-7	R-2	R-11	High Heating
20	30%	0.35	R-38	R-16	R-11	R-6	R-2	R-7	High Heating

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Prescriptive Packages - Zone 16

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Package	MAXIMUM		MINIMUM						Heating/Cooling Equipment Efficiency[9]
	Glazing Area Percent[1]	Glazing U-Value[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Basement Wall R-Value[6]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	12%	0.55	R-38	R-18	R-15	R-12	R-3	R-11	Normal
2	12%	0.45	R-30	R-13	R-19	R-17	R-10	R-18	Normal
3	15%	0.45	R-38	R-18	R-15	R-12	R-3	R-11	Normal
4	15%	0.35	R-38	R-13	R-15	R-12	R-3	R-11	Normal
5	20%	0.40	R-49	R-18	R-19	R-17	R-9	R-17	Normal
6	20%	0.35	R-38	R-19	R-15	R-12	R-3	R-10	Normal
7	25%	0.35	R-49	R-20	R-21	R-19	R-16	R-22	Normal
8	25%	0.30	R-49	R-18	R-15	R-12	R-3	R-11	Normal
9	30%	0.30	R-49	R-20	R-21	R-20	R-17	R-24	Normal
10	30%	0.30	R-49	R-23	R-19	R-17	R-10	R-18	Normal
11	12%	0.75	R-30	R-13	R-13	R-11	R-2	R-11	High Heating
12	12%	0.65	R-38	R-11	R-11	R-8	R-0	R-7	High Heating
13	15%	0.70	R-38	R-19	R-11	R-9	R-2	R-8	High Heating
14	15%	0.65	R-30	R-14	R-15	R-12	R-2	R-13	High Heating
15	15%	0.45	R-19	R-13	R-11	R-7	R-0	R-6	High Heating
16	20%	0.60	R-38	R-19	R-15	R-14	R-3	R-16	High Heating
17	20%	0.50	R-30	R-11	R-19	R-18	R-6	R-26	High Heating
18	25%	0.50	R-49	R-19	R-15	R-14	R-2	R-15	High Heating
19	25%	0.40	R-38	R-13	R-13	R-10	R-2	R-10	High Heating
20	30%	0.40	R-38	R-16	R-15	R-14	R-2	R-15	High Heating
21	30%	0.40	R-49	R-17	R-13	R-11	R-2	R-11	High Heating

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Prescriptive Packages - Zone 17

1993 Model Energy Code for Multifamily Buildings

Package	MAXIMUM		MINIMUM						Heating/Cooling Equipment Efficiency[9]
	Glazing Area Percent[1]	Glazing U-Value[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Basement Wall R-Value[6]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	12%	0.40	R-38	R-20	R-19	R-17	R-14	R-18	Normal
2	12%	0.35	R-49	R-19	R-15	R-12	R-4	R-11	Normal
3	15%	0.35	R-49	R-20	R-19	R-17	R-14	R-18	Normal
4	15%	0.30	R-49	R-16	R-19	R-16	R-11	R-16	Normal
5	20%	0.30	R-49	R-25	R-19	R-17	R-15	R-18	Normal
6	12%	0.65	R-38	R-17	R-15	R-13	R-3	R-15	High Heating
7	12%	0.50	R-38	R-13	R-13	R-11	R-2	R-11	High Heating
8	12%	0.40	R-30	R-13	R-11	R-9	R-2	R-7	High Heating
9	15%	0.55	R-38	R-19	R-15	R-13	R-3	R-15	High Heating
10	15%	0.45	R-30	R-15	R-15	R-14	R-3	R-15	High Heating
11	20%	0.45	R-49	R-16	R-19	R-19	R-8	R-26	High Heating
12	20%	0.35	R-38	R-13	R-15	R-13	R-3	R-15	High Heating
13	25%	0.35	R-38	R-19	R-15	R-14	R-3	R-15	High Heating
14	25%	0.35	R-49	R-21	R-13	R-11	R-2	R-11	High Heating

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Prescriptive Packages - Zone 18

1993 Model Energy Code for Multifamily Buildings

Package	MAXIMUM		MINIMUM						Heating/Cooling Equipment Efficiency[9]
	Glazing Area Percent[1]	Glazing U-Value[2]	Ceiling R-Value[3]	Wall R-Value[4]	Floor R-Value[5]	Basement Wall R-Value[6]	Slab Perimeter R-Value[7]	Crawl Space Wall R-Value[8]	
1	12%	0.40	R-49	R-18	R-19	R-17	R-14	R-17	Normal
2	12%	0.35	R-38	R-21	R-15	R-12	R-4	R-11	Normal
3	15%	0.35	R-49	R-20	R-19	R-17	R-15	R-18	Normal
4	20%	0.30	R-49	R-25	R-19	R-17	R-16	R-18	Normal
5	12%	0.65	R-38	R-17	R-15	R-13	R-3	R-15	High Heating
6	12%	0.50	R-38	R-13	R-13	R-11	R-2	R-11	High Heating
7	12%	0.45	R-30	R-13	R-13	R-10	R-2	R-10	High Heating
8	15%	0.55	R-38	R-19	R-15	R-13	R-3	R-15	High Heating
9	15%	0.35	R-38	R-13	R-11	R-8	R-2	R-7	High Heating
10	20%	0.40	R-49	R-17	R-13	R-11	R-2	R-11	High Heating
11	20%	0.35	R-38	R-13	R-15	R-13	R-3	R-15	High Heating
12	25%	0.40	R-49	R-20	R-19	R-22	R-13	--	High Heating
13	25%	0.35	R-38	R-16	R-19	R-17	R-7	R-22	High Heating

-- Hyphens (--) indicate that the package which contains the hyphens cannot be used with a slab foundation.

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Prescriptive Packages - Zone 19

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Package	MAXIMUM		MINIMUM						Heating/Cooling Equipment Efficiency [9]
	Glazing Area Percent [1]	Glazing U-Value [2]	Ceiling R-Value [3]	Wall R-Value [4]	Floor R-Value [5]	Basement Wall R-Value [6]	Slab Perimeter R-Value [7]	Crawl Space Wall R-Value [8]	
1	12%	0.40	R-49	R-22	R-21	R-13	R-8	R-12	Normal
2	12%	0.35	R-38	R-22	R-19	R-12	R-5	R-11	Normal
3	15%	0.30	R-38	R-21	R-21	R-14	R-8	R-13	Normal
4	15%	0.30	R-49	R-21	R-19	R-12	R-5	R-10	Normal
5	12%	0.65	R-38	R-19	R-19	R-12	R-3	R-13	High Heating
6	12%	0.45	R-38	R-13	R-15	R-9	R-2	R-8	High Heating
7	12%	0.35	R-30	R-11	R-15	R-9	R-2	R-8	High Heating
8	15%	0.45	R-38	R-19	R-13	R-8	R-2	R-7	High Heating
9	15%	0.35	R-30	R-11	R-19	R-12	R-3	R-12	High Heating
10	20%	0.40	R-49	R-21	R-15	R-9	R-2	R-8	High Heating
11	20%	0.35	R-38	R-13	R-21	R-14	R-5	R-16	High Heating
12	25%	0.35	R-49	R-19	R-19	R-12	R-3	R-13	High Heating

-- Hyphens (--) indicate that the package which contains the hyphens cannot be used with the indicated foundation type (slab or crawl space).

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FOOTNOTES:

[1] Glazing area is the ratio of the area of the glazing assemblies (including sliding-glass doors, skylights, and basement windows but excluding opaque doors) to the gross wall area, expressed as a percentage. Up to 1% of the total glazing area may be excluded from the U-value requirement. For example, 3 ft ^{2} of decorative glass may be excluded from a building design with 300 ft ^{2} of glazing area.

[2] Glazing U-values should be tested and documented by the manufacturer in accordance with the National Fenestration Rating Council (NFRC) test procedure, taken from the glazing U-value table in Appendix B, or derived from an alternate test procedure or table accepted by your local jurisdiction. Center-of-glass U-values cannot be used.

[3] The ceiling R-values do not assume a raised or oversized truss construction. If the insulation achieves the full insulation thickness over the exterior walls, R-30 insulation may be substituted for R-38 insulation and R-38 insulation may be substituted for R-49 insulation. Ceiling R-values represent the sum of cavity insulation plus insulating sheathing (if used). For ventilated ceilings, insulating sheathing must be placed between the conditioned space and the ventilated portion of the roof.

[4] Wall R-values represent the sum of the wall cavity insulation plus insulating sheathing (if used). Do not include exterior siding, structural sheathing, and interior drywall. For example, an R-19 requirement could be met *EITHER* by R-19 cavity insulation *OR* R-13 cavity insulation plus R-6 insulating sheathing. Wall requirements apply to wood-frame or mass (concrete, masonry, log) wall constructions, but do not apply to metal-frame construction. Metal-frame wall equivalent R-values can be found in Appendix C.

[5] The floor requirements apply to floors over unconditioned spaces (such as unconditioned crawlspaces, basements, or garages). Floors over outside air must meet the ceiling requirements.

[6] Walls of conditioned basements below uninsulated floors must be insulated from the top of the basement wall to a depth of 10 ft below ground level or to the level of the basement floor, whichever is less. The entire opaque portion of basement walls with an average depth less than 50% below grade must meet the same R-value requirement as above-grade walls. Conditioned basement windows and sliding glass doors must be included with the other glazing. Basement doors must meet the door U-value requirement described in Note b.

[7] The R-value requirements are for unheated slabs. Add an additional R-2 for heated slabs, except in Zone 1 which does not require slab insulation. For packages with a slab insulation requirement, the insulation must extend a total linear distance of at least 24 in. in Zones 2-12 and 48 in. in Zones 13-17. The insulation must extend 1) down from the top of the slab, or 2) down from the top of the slab to the bottom of the slab and then horizontally underneath the slab, or 3) down from the top of the slab to the bottom of the slab and then horizontally away from the slab, with pavement or at least 10 in. of soil covering the horizontal insulation.

[8] The crawl space wall R-value requirements are for walls of unventilated crawl spaces. The crawl space wall insulation must extend from the top of the wall (including the sill plate) to at least 12 in. below the outside finished grade. If the distance from the outside finished grade to the top of the footing is less than 12 in., the insulation must extend a total vertical plus horizontal distance of 24 in. from the outside finished grade.

[9] *High Heating* means a furnace AFUE of 90% or more, or a heat pump HSPF of 7.8 or more. *High Cooling* means a SEER of 12 or more. *High Heat/Cool* means both heating and cooling equipment must meet these minimum efficiencies. If you plan to install more than one piece of heating equipment or more than one piece of cooling equipment, the equipment with the lowest efficiency must meet or exceed the efficiency required by the selected package. The following California counties do not qualify for the cooling equipment credit: Alameda, Contra Costa, Los Angeles, Marin, Monterey, Napa, Orange, San Benito, San Diego, San Francisco, San Luis Obispo, San Mateo, Santa Barbara, Santa Clara, Santa Cruz, Solano, Sonoma, and Ventura.

NOTES:

a) Glazing areas and U-values are maximum acceptable levels. Insulation R-values are minimum acceptable levels. R-value requirements are for insulation only and do not include structural components.

b) Opaque doors in the building envelope must have a U-value no greater than 0.35. Door U-values must be based on manufacturer data, taken from the door U-value table in Appendix B, or derived from an alternate test procedure or table accepted by your jurisdiction. If a door contains glass and an aggregate U-value rating for that door is not available, include the glass area of the door with your windows and use the opaque door U-value to determine compliance of the door. One door may be excluded from this requirement (i.e., may have a U-value greater than 0.35).

c) If a ceiling, wall, floor, basement wall, slab-edge, or crawl space wall component includes two or more areas with different insulation levels, the component complies if the area-weighted average R-value is greater than or equal to the R-value requirement for that component. Glazing or door components comply if the area-weighted average U-value of all windows or doors is less than or equal to the U-value requirement (0.35 for doors). Use the *R-Value/U-Value Weighted Average Worksheet* for these computations.